The NEW ZEALAND JOURNAL OF AGRICULTURE

Vol. 67. WELLINGTON, AUGUST 16, 1943. No. 2.

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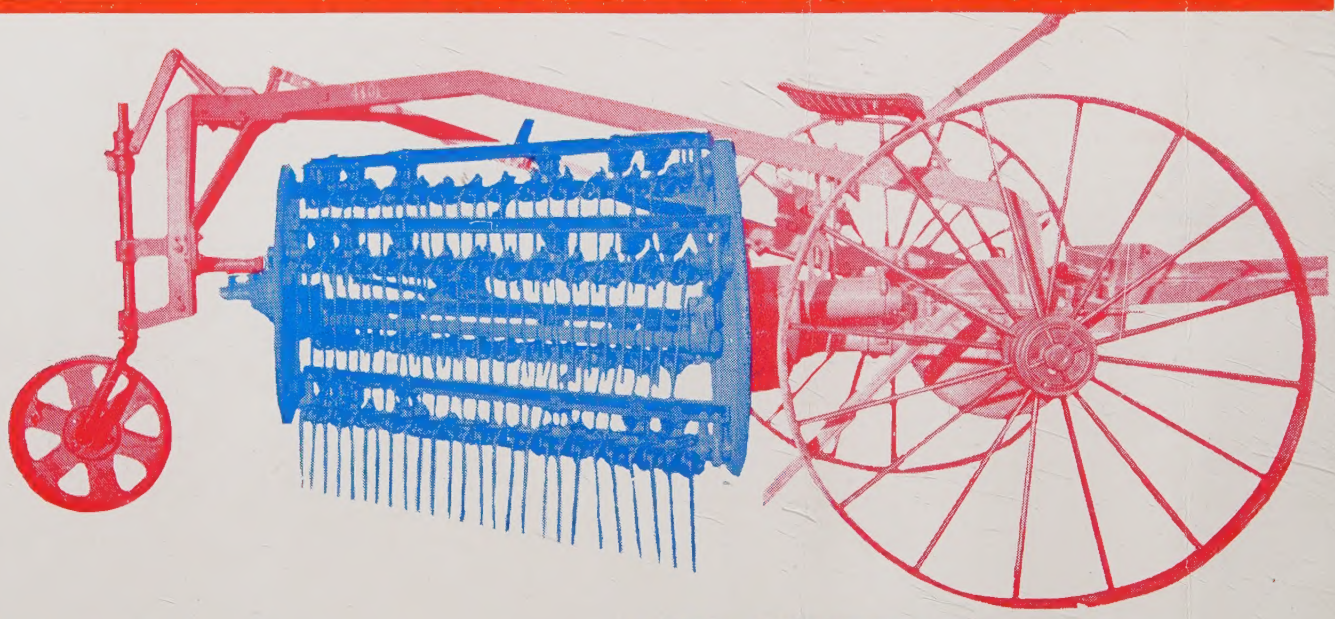

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THE NEW ZEALAND
JOURNAL OF AGRICULTURE

Vol. 67. No. 2.
August 16, 1943.
Wellington.

Published by direction of Hon. J. G. Barclay, Minister of Agriculture.

Few people realise that although the beekeeping industry in New Zealand produces in normal seasons approximately 3,000 tons of honey and many tons of beeswax annually, this production of important commodities is of lesser importance than is the work of the bees in pollinating the many agricultural crops for the production of seeds and fruit of economic importance.

Bees in Relation to Agriculture

— By —
E. SMELLIE,
Apiary Instructor, Christchurch.

WHILE beekeeping is an important branch of agriculture it may be a little difficult for the average person, including some beekeepers, to understand how and where honey bees fit into other agricultural programmes, but we know that when nature shows a proper balance between plants and pollinating insects, both plants and insects flourish. Agricultural development, however, has seriously interfered with this balance. It has demanded the growing of certain plants in enormous acreages, and has unwittingly destroyed native pollinating insects as well as their nesting places.

Both the reduction in wild beneficial insects and the increase in the crops requiring insect pollination have been gradual. While these changes were occurring commercial beekeeping had its inception, and fortunately so, since the presence of honey bees in most areas has not only overcome the shortage of wild pollinators, but has permitted more thorough pollination than would have been possible under normal conditions.

Clovers

Bumble bees, while important for pollination of red clover, are not numerous enough in this country to guarantee effective pollination on their own, and cannot be depended upon.

Farmers and growers are organised to maintain the production of meat, butter, cheese, fruit, and vegetables, and to do this successfully extensive cropping is necessary. To produce dairy products cows must have a well-balanced diet including the clovers, which belong to the legume family. As the clovers are self sterile and rely on insect pollination, farmers are consequently dependent upon honey bees to insure profitable seed yields through proper pollination. Legumes, or clovers, are especially important during a period of war, and their cultivation is the most economical method which farmers can utilise in returning and maintaining the nitrogen content of soils while there is a shortage of artificial fertilisers. Nitrogen is also required for munitions, and when more legumes are cultivated greater quantities of nitrates can be diverted to war purposes.

In the early days of this country white clover was introduced and grew luxuriantly in the first year, but gradually died down without seeding, there being insufficient insects and no bees at all to fertilise it. The first bees were landed in this country from England in March, 1839, and again in 1842 from New South Wales. Since that time the clovers have flourished and the yearly yields of seed produced have increased where bees are located.

Observations in Canterbury pastures where red clover was grown confirm the value of the honey bee. In a 43-acre pasture where bees were centrally located 3 bags of seed to the acre were yielded. Apart from the seed harvested the seed that fell during these operations was such that no further sowing of this pasture was necessary.

Commercial Orchards

In recent years the importance of honey bees in providing for pollination in commercial orchards is a question that has attracted the attention of orchardists. The role of the honey bee and other insects, since wind is of little value in cross pollination of fruit, is that of carrying the pollen or male element of this flower from the anthers of the stamena where it is produced to the stigma. The pollen tube then grows down through the stalk or style to the ovary, where the embryo seed is found. This act brings about the union of the female nucleus of the pollen, which is known as the process of fertilisation, the first

step in the development of the next plant generation, which results in the production of fruit.

The flowers of the principal fruits have many variations. Some are self fertile, which means that they may be fertilised by pollen from any other plant of the same variety. Other flowers are self sterile, meaning that pollen from some plant of another variety is necessary to complete fertilisation.

Many and varied experiments have been made to demonstrate that cross pollination is always desirable and usually necessary for the best set of fruit. These experiments have shown that the degree of self fertility and self sterility of different fruits vary somewhat with different seasons and localities, and also, that in general about two-thirds of the varieties of apples are self sterile.

Since these conditions exist among the principal commercial fruits the problem of cross pollination becomes an important one. The many species of insects found in the orchards at the blossom period are usually not abundant and are of little value to complete the process of fertilisation, owing to their habits of living a solitary existence during the winter, and because of the short time available for reproduction during the spring preceding the fruit blossom period.

Honey bees on the other hand live in colonies of 15,000 to 30,000 individuals during the winter and are kept under the control of man. The number of individuals in each colony is greatly increased at the proper time, in the spring, and this work assures the orchardist of more perfect pollination of blossoms with better set fruit than any other fertilising medium.

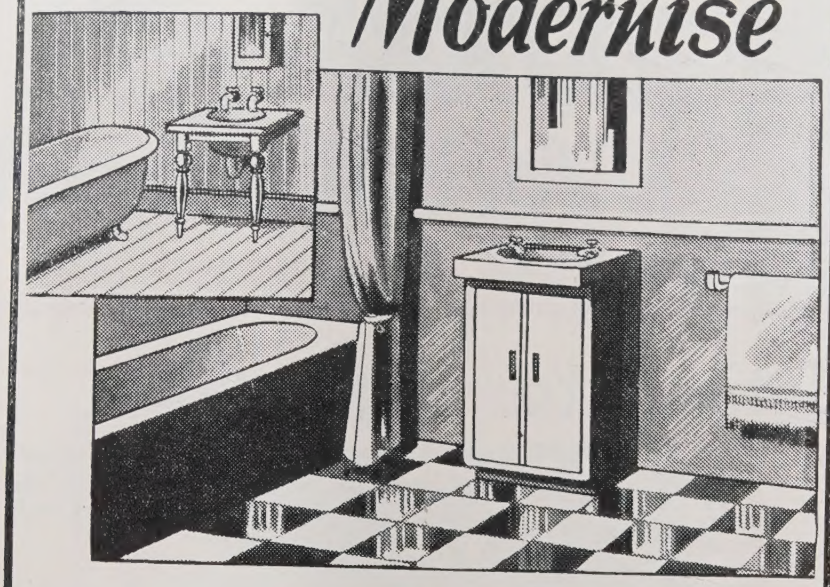
An outstanding feature of bee behaviour is the habit of visiting one kind of flower at a time in a systematic search for nectar required by the parent colony for feeding purposes, whereas other insects take up nectar solely for their own sustenance and visit all flowers promiscuously.

Under Control

Finally, the honey bee is the only one of the insect pollinators that man has under his control. This allows for the distribution of bees in any desired area where pollination service is required. The yielding of nectar from flowers stimulates the colony, and the field bees, in searching diligently for nectar, pollinate the seed and fruit crops. There are many factors, however, that have a bearing on this question. If the temperature at the time the flowers are in full bloom is below 60 or 65 degrees the bees will be unable to do much work on the blossoms and their attention will be confined to those nearest to hand. In very windy or wet misty weather the bees will not be able to fly at all.

It is important to have a large force of bees available, so that, if there are a few hours of good sunny weather the bees can do their work more thoroughly.

Modernise



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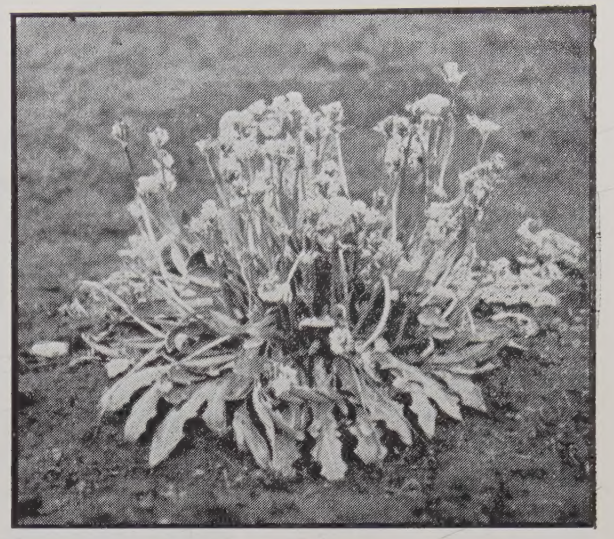
RUBBER PRODUCTION IN NEW ZEALAND

Trials With Kok-saghyz

V. D. ZOTOV, Botany Division, Plant Research Bureau, Department of Scientific and Industrial Research, and E. P. WHITE, Chemical Laboratory, Animal Research Division, Department of Agriculture.



A kok-saghyz plant in full flower at Hastings.
[G. A. BLAKE, 'Photo.

A BRIEF account of rubber production developments in Russia was published in the December, 1942 issue of this journal. The present article includes supplementary notes, together with observations on experiences in New Zealand.

Kok-saghyz (*Taraxacum kok-saghyz*) a recently discovered rubber-bearing plant, is closely related to, and is much like the common dandelion (*T. officinale*). It is somewhat smaller in all its parts, has leaves much less lobed, or even quite entire, somewhat fleshy and bluish in hue. The flower heads have the green bracts capped with a conical knob just below the tip, which makes the species readily recognizable. It is a perennial plant bearing latex rich in high quality rubber.

The original wild species is a rather heterogenous assemblage of plants, which fact fortunately renders the species readily adaptable to a wide range of environmental conditions.

Seed Germination

The seed is small and light. There are some 900,000 seeds per pound. The samples received here have average germination capacity of about 73%, but only about 50% of seed produce healthy seedlings. Total germination under laboratory conditions takes place within 14 days at 68 deg. F. Untreated seed produce first 50% of total germination in the first five days. This time can be reduced to one day by keeping seed in moist condition in thin layers on trays in chamber at 35 deg. F. for two weeks before sowing. The seed is then dried for an hour to facilitate sowing.

Sowing the Seed

Sowing made in November in pots at depths of ⅛in., ¼in., and ½in. produced seedling emergence of 50%, 16%, and 5% respectively. Total emergence was attained within ten days. These figures would suggest that provided the soil is not too dry the sowing should be made not deeper than ¼in. below surface. Hence also the necessity for a fine seed bed. The seedlings grow slowly during the first month. Because of this and the difficulty in distinguishing kok-saghyz seedlings from those of weeds, it is essential to select ground as free as possible from weeds.

In Russia the seed is sown either in the spring or autumn at the rate of 2½ to 3½ lb. per acre, in rows 15in. to 18in. apart. When seedlings are well established the rows are thinned out, leaving 4-inch spaces between clumps of plants approximately 3 inches long.

Manurial Treatment

The manurial treatment evolved in Russia is elaborate and varies considerably from place to place. The following are the essential features: On acid soils an application of lime up to ½ ton per acre is found beneficial. Liberal quantities of organic manure are used on most soils. Mineral fertilizers are applied separately. In general, most suitable proportions are

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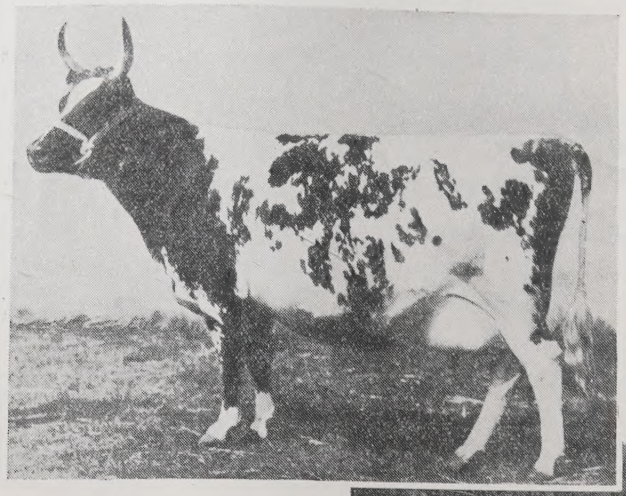

(Left) One of the leading dams in the progressive Puketutu Stud (Mr. H. J. Kelliher) Mangere, Auckland. This depicts Alanvale Winalot Imp., winner of six firsts, four championships and one reserve championhip at various national shows. Puketutu Ayrshires are big and consistent users of "WONDER" Mineral Stock Food.

(Right) A select lot of Puketutu Stud Ewes, bred and reared under perfect natural conditions. Here again, "WONDER" plays its part in maintaining the quality and stamina of the Flock.

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equal amounts of nitrogen and phosphorus. In dry seasons greater quantities of phosphorus are beneficial. Both phosphorus and potassium improve the quality of rubber. Both nitrogen and potassium tend to lower the rubber content. A little nitrogen and the main body of fertilizer are incorporated deeply into the soil. Several top-dressings consisting mainly of nitrogen are applied at intervals between leaf formation and seeding stage.

Processing the Roots

In Russia the crop is treated as either annual or biennial. In any case, the roots are lifted with the aid of a sugar-beet lifting machine at the time that the leaves begin to die down. They are then stored in much the same way as sugar beet.

At the rubber processing plant the roots are soaked, washed and then cut into pieces ⅛-¼ in. long, under water containing alkali into which the latex flows. The extraction may be variously speeded up. Some toluene or thymol is added to the solution as a bactericidal. The solution is separated from debris, and rubber concentrated to about 40% by centrifuging which may be done with a cream separator. The rubber is then coagulated with acid.

Progress of N.Z. Trials

The desirability of growing rubber in this country was considered advisable immediately rubber began to be in short supply. Kok-saghyz commended itself as a plant likely to be suitable. To enquire into its possibilities a committee consisting of members of the Departments of Agriculture and of Scientific and Industrial Research was set up. The co-operation of the Cawthron Institute and the certain Services' Vegetable Production areas was enlisted and arrangements were made for trial plots to be laid down at the following centres: Ruakura, Hastings, Lower Hutt, Blenheim, Nelson, Timaru and Alexandra. The seed was obtained through the courtesy of the United States Department of Agriculture (10lb. of seed arriving here in November, 1942) and of the Commonwealth of Australia Council for Scientific and Industrial Research (14lb. of seed arriving here last March).

Owing to the lateness of the season and the abnormally dry weather prevailing till late autumn the establishment was difficult, and nearly all directly sown seed, including one acre for seed production, had completely failed to germinate. The only exception to this were the initial sowing of two rows at Lower Hutt and a small plot at Alexandra. Some 50 plants were raised at Alexandra. At Lower Hutt the two rows were surface sown, and raked over lightly, and the strike was quite good.

Successful plots were, however, established at Hastings, Lower Hutt, Blenheim and Nelson from box-grown seedlings. The seedlings were transplanted into plots when about one month old. Plants were spaced 14in. in rows 21in. apart. Manurial treatment was followed only in the Nelson plot. Part of this plot received an application of superphosphate only at the rate of 300lb. per acre. The other part, tomato fertilizer at the rate of 600lb. per acre. The analysis of the latter is as follows:

300 lb. superphosphate	(26 lb. P)
120 lb. sulphate of potash	(48 lb. K)
90 lb. sulphate of ammonia	(28 lb. N)
90 lb. dried blood	(28 lb. N)

The plants proved to be very heterogenous as regards leaf shape, time of

Root development of kok-saghyz plant at Hastings.
[G. A. BLAKE, 'Photo.

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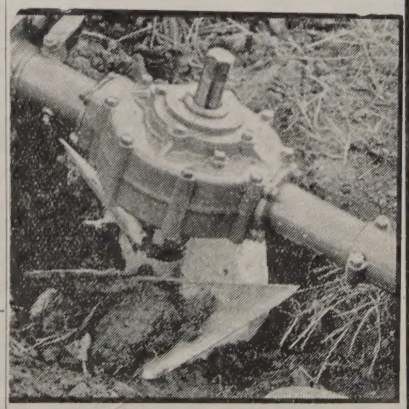

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flowering, root branching and rubber content. At Lower Hutt the plants had leaves in perfectly flat rosettes, varying up to 10in. in diameter, but the majority measuring about 8in. Some plants commenced flowering in February, others not until late in the autumn. The majority were still flowering in June, when the leaves began to die down. The roots on the whole were much like those in an illustration in the December issue of this journal, but the amount of branching varied considerably. Alexandra plants had almost perfectly straight tap roots; Lower Hutt ones had the roots fairly strongly branched, while Nelson plants had heavily branched roots. This may have been due to the effect of transplanting. The percentage of rubber content in the larger samples varied as much as 1.1 to 2.9 in the individual roots.

A report on the first crop of koksaghyz grown in New Jersey by the United States Rubber Company was announced recently. The official analysis of rubber content at the close of last year was slightly over one per cent. of raw root. This is not as high a percentage as obtained in our experimental plots.

Summary

The summary of the tests so far available is given in the table below. For convenience the root yield is given in tons and the rubber yield in pounds per acre. In both cases it was assumed as a standard of comparison that one acre would produce 120,000 plants.

much more spaced than they should have been. Also, the plants were sown in December, not in October, as they should have been, and they were still growing at the time of the last sampling, so that the rapid monthly increase in rubber yield, which is apparent in samples from Lower Hutt, is significant and highly encouraging. With an appropriate manurial treatment even better results might well be expected.

These experiments are being continued and tests for rubber content will be made from two-year-old material in established plots. Additional sowings will be made in the coming spring at Lower Hutt and other suitable areas and it is hoped to harvest seed from the autumn sowing made near Timaru. Further results will be published as the information becomes available.

TABLE OF ANALYSIS OF E XPERIMENTAL SAMPLES.

Location of Plots.	Date of Sampling.	Age of Plants in days from sowing.	No. of plants per sample.	Yield of green root in tons per acre allowing 120,000 plants per acre.	Yield of rubber in lb. per acre, allowing 120,000 plants per acre.	Rubber content % green weight of root.
Lower Hutt	15-2-43	88	3	0.6	5	0.4
,, ,, ...	17-3-43	118	3	0.9	23	1.2
,, ,, ...	18-4-43	150	3	2.4	64	1.2
,, ,, ...	21-5-43	183	3	3.0	173	2.4
Alexandra	16-4-43	137	10	1.9	81	1.9
Hastings	7-6-43	192	10	3.1	104	1.5
Nelson, "super" only ..	15-4-43	136	10	3.6	70	0.9
,, ,, ,, ..	8-6-43	190	7	7.0	245	1.6
Nelson, "tomato" fertiliser	15-4-43	136	10	3.2	89	1.2
,, ,, ,,	8-6-43	190	7	7.0	279	1.8

Conclusions

In drawing conclusions from the above results it must be remembered that the number of plants per acre is assumed. The samples tested were small, and the plants were grown

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Low Germination of Perennial Ryegrass Seed in South Otago

DURING the past two seasons considerable financial loss together with much loss in valuable time, running costs, and depreciation of equipment have occurred as a result of low germination in ryegrass due to the "Blind Seed Fungus."

In a large number of cases, farmers, as a result of good growth of grass, were able to close up fields which were not required for grazing, for seed production. Apparently excellent seed crops resulted, which were reaped, stooked, stacked, threshed, and railed some distance to dressing stations, only to yield germinations as low as 1 per cent. in one case, and in very few cases higher than 30 per cent. Even this latter seed has little commercial value and its cost of production per bushel of viable or germinating seed to the grower would probably range from £2 to £3 per bushel, which is considerably in excess of the price for the highest germinating, purest and best type of perennial ryegrass.

Farmers find it imperative to take precautions in many directions against unpayable crops. The risk of loss in a ryegrass seed crop due to low germination can be reduced if farmers in "doubtful" districts adopt the suggestions for testing which are outlined in this article.

— By —

A. F. GREENALL,
Instructor in Agriculture,
Balclutha.

Climatic Influence

A large amount is known about the cause of the low germination caused by the "Blind Seed Fungus" but practically nothing about its control. Germination will unaccountably vary considerably from season to season, from place to place, from field to field, and often in different places in the same field. One thing that has become increasingly apparent is that climate, and in particular humidity, exercise a great influence on the severity of attack. It is usual that seasons in which large yields of seed per acre are obtained are often the seasons of lowest germination, while less growthy seasons are often, if not invariably, accompanied by good germinations. Good growing springs and summers on the rolling country of South Otago are the occasions of high rainfall, while the poorer growing seasons are often the result of near drought conditions.

The wet seasons which favour development of blind seed fungus are the seasons in which there is a surplus growth and during which large areas are closed up for seed. Conversely, in dry seasons when good germinations can normally be anticipated, all grass is required for livestock, and only small areas are closed up for seed.

Many farmers who have experienced consistently low germinations are no longer interested in perennial ryegrass seed production, while many more farmers who have had only one experience with this trouble state that they have had one experience too many.

Investigations

During the progress of the investigation into this disease which was carried out by the Seed Testing Station, Palmerston North, it was decided to endeavour to discover if a correlation existed between the appearance of disease on the ryegrass seed two or three weeks before ripening, and the final germination of the seed following on threshing and machine dressing. If so, then it would be possible to examine a ryegrass crop just prior to reaping, and state with some degree of accuracy the probable germination of the dressed seed.

Many sheaves of slightly green ryegrass seed-heads were collected from districts all over New Zealand, despatched to Palmerston North, examined, and the percentage of seed attacked by the fungus counted. Sub-

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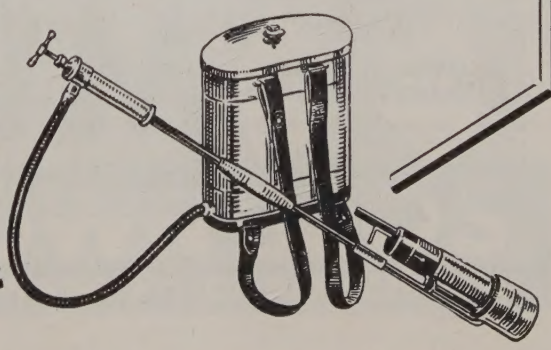
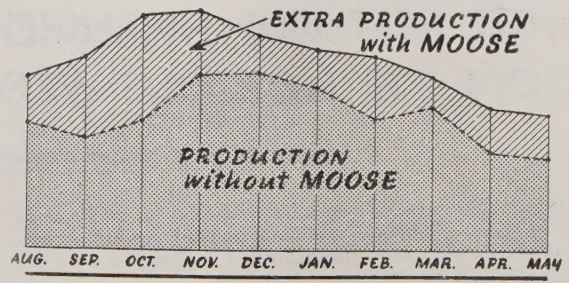


AUGUST PROBLEMS

on the dairy farm . .

1. EARLY CALVERS

The whole season's production is dependent upon the feeding of dairy cows NOW. Until spring pastures come away, cows are milking on winter grass, hay or silage, and unless high protein food is added to balance the daily rations they will drain their vital resources and production will suffer throughout the whole season. It is not easy to lift production once it has dropped; but the remedy is to feed Moose Oil-cake meal until pastures are adequate. MOOSE supplies the nutrients for milk and prevents the cows drawing on body reserves. Feed daily in boxes in the dummy bails 1lb. Moose or more according to the cow's production. The graph below shows the added production of butterfat throughout the season from a North Taranaki herd of 28 cows fed on Moose during the critical weeks after calving.



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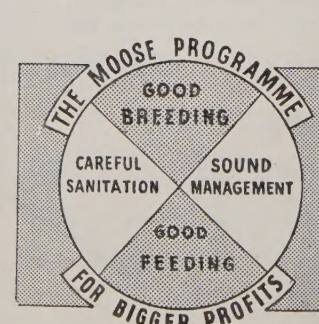

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sequent to this, germination tests were made of the machine dressed seed from the same areas, and it was found that a fairly good correlation existed between the percentage of immature non-diseased seed and the percentage of germinating seed in the machine-dressed sample.

The following are actual results obtaining during one year in South Otago for widely separated farms:—

Sample.	% Seed not Infected with Fungus 2 weeks before reaping.	Germination of Machine Dressed Seed.
	%	%
A	28	15
B	17	12
C	20	18
D	86	66
E	5	12
F	24	27
G	6	12
H	37	35
Average	28%	25%

As a result of the correlation obtained the Seed Testing Station instituted a prompt service for the examination of sheaves of ryegrass taken from a field immediately prior to reaping. A report was made on each sample, saying, for example, that 20 per cent. of the seed in the sample was infected, from which it could reasonably be assumed that a final germination in the vicinity of 80 per cent. might be expected, or that 70 per cent. of the seed was infected, indicating that a germination of only 30 per cent. could be expected. In the latter case the farmer concerned could mow the crop for hay—which of course would be over-ripe—or leave it for a clover crop.

Even if a crop has been reaped or even reaped and stacked, it would be prudent to rub out seed and send a representative sample to the nearest office of the Department of Agriculture to be tested for germination. From the results available the farmer will then be able to decide whether it would pay to thresh the stack and dress the seed, or to use the sheaves for dry feed.

Germination of Diseased Seed: Some farmers have expressed their doubt as to the accuracy of the germination test made by the Seed Testing Station, stating that germination of seed in the soil is natural and as a result far better than an artificial test. For instance, one farmer sowed 3 bushels of a line of ryegrass seed infected with blind seed fungus germinating only 20 per cent. and had a wonderful strike.

At the Seed Testing Station, however, all tests are carried out in triplicate according to a careful technique evolved by research workers and adopted the world over, and there is little, if any, chance of inaccurate germination counts. Secondly, the apparatus used in promoting germination provides ideal and optimum conditions for germination, with the result that it is likely that laboratory germination will be higher than actual field germination. Thirdly, when 3 bushels of 20 per cent. germinating seed is sown, this is equal to 12-15lb. of live seed sown per acre, which is sufficient to give a very good cover, provided germinating conditions in the soil are satisfactory.

Another doubt expressed by farmers is indicated by the statement that "seed tested in March germinated 60 per cent. and when tested again in October-November germinated 68 per cent.; hence one or other of the tests must be inaccurate." Ryegrass seed rarely shows an appreciable increase in germinating capacity during storage. Differences in results, as quoted above, are probably mainly attributable to sampling error which cannot be entirely eliminated, but can be kept within reasonable limits by efficient sampling and replication of tests.

Ryegrass seed having a low initial germinating capacity as a result of blind seed fungus generally retains its germinating capacity as well as does seed with a high initial germinating capacity.

It may be expected that one year in every two or three in South Otago will be accompanied by poor germinations in ryegrass. Many farmers, after having had one experience with low germination, refuse to close up fields for seed even if there is a surplus growth. It appears imperative for those farmers who have adopted the harvesting of ryegrass seed as a part of their farm programme to close up fields every year irrespective of the type of season. By so doing they will ensure that in a proportion of seasons they will have high germinating lines to sell at a remunerative price and so cover the loss due to one year of low ryegrass germination.

To recapitulate, a test should be made on all fields of ryegrass just prior to their being cut in order to predict probable germination. Failing this, a sample should be rubbed out of stack and germinated to decide whether the germination warrants threshing and machine dressing.

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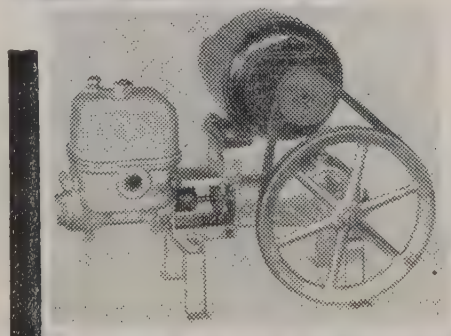

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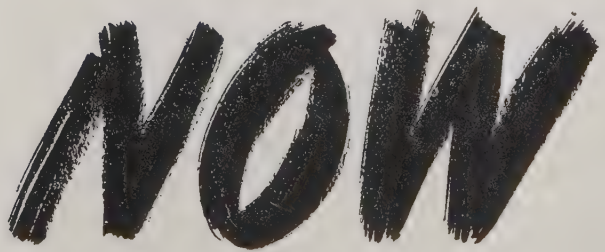

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Lupin Poisoning of Sheep

THE following is an account of a mortality in sheep in two instances following the feeding of blue lupins (*lupinus augustifolius*).

First Case

In the first case, out of a flock of 400 ewes a total of 43 died between May 22 and June 5. The paddock on which the mortality occurred was sown in lupins and turnips. Lambs were put on previous to the ewes, and had eaten most of the turnips and the leafy part of the lupins. There was no mortality or evidence of sickness in the lambs.

— By —

A. G. BRASH, B.V.Sc.,
Veterinarian, Christchurch.

When the ewes were put on on May 17 the available feed, therefore, consisted mainly of lupin-pods containing seeds, which lay rather thickly on the ground, together with a small percentage of turnips and the bare stalks of the lupins. The ewes had a run off on to a paddock of cocksfoot which had been cut for seed, but had access to the lupin paddock continuously. Deaths started to occur on May 20, three days after the ewes were put on the paddock, and when a visit was made to the farm on May 22, 17 had died and others were sick.

Marked symptoms were observed in two ewes. One ewe remained behind when the flock was driven. She showed evidence of motor irritation, the head being thrown back and the eyes staring. When forced to move, she ran blindly ahead with a high stepping gait. Examination of the conjectiva showed distinct evidence of icterus. The other ewe was standing under a gorse-bush in a state of stupor, with the head lowered, and could not be forced to move. She was destroyed and a post-mortem examination made.

The ewes examined were in good condition, except in one case. General icterus was the most characteristic finding in all the cases examined. The yellow-staining of the visceral and subcutaneous fat was very obvious. The liver was a bright yellow colour throughout and friable. The gall bladder was distended and showed catarrhal inflammation. There was catarrh of the abomasum and small intestine. The contents of the abomasum were coated with mucus in one case. Apart from the change in colour caused by the icterus the other organs appeared normal.

A saline aperient was recommended for sick ewes, and the owner was, of course, advised to keep the ewes off the lupins in the meantime.

Second Case

In the instance of the second farm lupins were very extensively grown and were the main winter feed provided. At the time of inspection lupins were growing on 300 acres, mostly with oats. The paddock on which the mortality occurred was sown with two bushels of lupins, together with ryegrass and red clover in March. The lupins were harvested at the beginning of the following January. At the end of January, 26 Border Leicester ram hoggets were put in this paddock for two weeks. Twelve of these became affected with what appeared, from the owner's description (no notification was received of this mortality) to be photosensitisation, and seven died. There was no shelter available in the paddock. There was considerable swelling about the head, and the skin came off the ears and the nose and also along the top of the head. These symptoms are identical with those described as occasionally occurring in cases of lupinosis.

At the beginning of March, 250 Corriedale ewes were put on to the paddock for a fortnight. Deaths occurred up to a week after the ewes were taken off the lupins. Altogether, ten ewes died, but this mortality was not notified.

The main flock of 1,000 ewes, which included the 250 mentioned above, were put on this particular paddock in mid-May, although they had been on lupins about 6 inches high in another paddock for a month previously. They were put on for 3 to 4 hours daily, and after cleaning up the remainder of the lupins were then shifted to a grass paddock for two days, following which they were again put back on the ryegrass and clover paddock on May 24. Deaths occurred on May 30, and at the

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time of a visit on May 31, four had died and others were showing marked symptoms. Up to June 9 a total of 29 had died. There was no evidence of green lupins in the paddock at this time, but some dried pods and mouldy seeds were found amongst the grass.

All the badly-affected cases showed dopiness and depression, with a marked tendency to wander to the fences and stand there with heads lowered and pushed back against the fence. In one case the faeces were tar-like in colour and consistency. The conjunctiva showed yellow staining. A section of the flock was run into the yards and the conjunctiva examined. It showed distinct yellow staining in about 10 per cent. of the ewes examined. In one case the icterus was accompanied by a purulent discharge from the nose. The findings were similar to those described for the first mortality.

It was recommended that the conjunctiva be examined in all the ewes, and that all those showing signs of icterus be kept off the lupins entirely in the future and given other supplementary feed.

Acute Lupinosis

It is evident that in both these mortalities the symptoms and post-mortem findings correspond closely with the condition described as acute lupinosis, in the cause of which the icterogenic factor predominates. In no case did the findings suggest that alkaloids alone were responsible for the deaths, as has been observed in America. The occurrence of deaths up to two weeks after the sheep were removed from the lupins is consistent with the amount of liver damage found on post-mortem examination.

The literature on lupinosis dealing with the toxic content of the plant, and in this case the seed-pods, is not very definite. It is possible that the toxin is produced by fungi which grow on dead plants or on the food itself after storage, and that it is allied to the bacterial and fungoid toxins. This view is supported by the fact that the toxicity is retained in food that has been left in the open for a long time.

The toxin affects the mucous membrane of the alimentary canal, and after absorption affects the liver, setting up fatty degeneration and catarrh of the gall bladder. Jaundice of the visible mucous membranes is, therefore, commonly seen in the majority of cases. The urine contains bile pigments and bile acids. In occasional cases there is an erysipelatous swelling of the skin of the head, especially in the region of the ears and nose.

Care in Feeding

In regard to the feeding of blue lupin seed to stock, as occurred in these instances, the following notes are of interest.

The seeds are very bitter and contain toxic alkaloids, but they can be fed to animals if they are well soaked and washed in water and the toxic principles bleached out. Such a course is impracticable under the conditions existing on the farms where the seed in the seed-pods on the ground was picked up and consumed by the sheep. It must again be realised that the growing of lupins is carried out mainly with a view to improving the soil on poor, light land, and this object is achieved whether the lupins are ploughed in green or whether the green crop is folded by sheep. In all cases of folding by sheep, it would appear very desirable to avoid letting the sheep have access to the crop after the seed-pods are formed or after the seed-pods have fallen to the ground. If the plant is fed before pods are formed it is not nearly so toxic.

It is generally accepted that the blue variety is the least toxic variety, and as the toxin is mainly concentrated in the seeds, the feeding in the green, leafy stage would appear to be attended with very little risk. The crop has a marked effect on succeeding crops, and for this reason is persevered with.

The toxic substance does not appear to be cumulative, so that the danger from feeding lupins is reduced if the amount fed at any one time is limited. The feeding off of a crop requires to be carried out with judgment, if mortalities such as those recorded are to be avoided in all cases.

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WEEDS

Annual Weeds

(Continued).

— By —
S. H. SAXBY,
Instructor in Agriculture,
Dunedin.

IN discussing the various weeds it has, for the sake of simplicity and ease of recognition, been decided to arrange these in three groups, namely annual, biennial, and perennial. These in turn are arranged in alphabetical order of their most common names.

ANNUAL WEEDS.

Chickweed (*Stellaria media*).—This exceedingly common annual weed occurs chiefly in the wetter districts where it is often troublesome in root crops. Chickweed is of a light and shining green colour and is hairless except for a line of hairs down one side of the stalk. The flowers are white and small.

It has long sprawling stems, a mature plant forming a dense mat up to 18 inches in diameter. Like most other annual weeds of this type, it is chiefly serious in root crops in wet situations where, if cultivation is inefficient, considerable smothering may take place. Control of chickweed entails early and thorough cultivation and the prevention of seeding. In pastures it is of little moment as it does not compete vigorously with a good sward of quick-growing grasses and clovers and after the first year usually disappears altogether.

Mouse-eared chickweed is a common perennial of closely grazed pastures and lands.

Mouse-eared Chickweed (*Cerastium vulgatum*) is somewhat similar to chickweed in habit, but is covered with short hairs and is of duller and darker green colour. It is a perennial and is sometimes troublesome in pastures. Stock will eat it but seldom damage it sufficiently to kill it out. As is the case with most ills prevention is better than cure. It is seldom of much moment in a vigorous sward of grasses and clovers, and is commonest in hard grazed pastures of lower producing grasses.

Cornbind or Bindweed (*Polygonum convolvulus*).—This annual plant belongs to the dock family and is most serious in cereal crops in heavy land, where it sometimes grows and twines up the crop sufficiently to pull it down. It increases fairly rapidly by seed and is consequently more serious on land that is being continually cropped. Control consists in methods which favour its destruction in the early stages, such as the feeding off of the cereal crop or of growing green feed crops. Laying down to pasture for several years reduces its incidence greatly as the seeds are short lived in the soil.

Cornbind is a hairless twining plant with somewhat heart-shaped leaves. The flowers are small and are present in clusters of 4 or 5 or more along the stem. The seed is triangular like that of the docks and is black in colour. This description should serve to differentiate cornbind from convolvulus with which it is often confused.

Dodder (*Cuscuta epithymum*).—This is an annual parasitic plant that is sometimes responsible for a considerable amount of damage to white clover, red clover, and lucerne in the northern districts. Being an annual plant it starts off from seed each year just as other plants do. From then on, however, its existence is very different from that of other plants.

On germinating, the seed produces a fine white threadlike stem, which, if it does not come in contact with a suitable host plant, dies. If, however, it contacts a suitable plant this stem will twist itself around its host. At the points of contact the dodder plant

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produces suckers which attach themselves to the host plant.

Once attached the dodder plant develops rapidly, continually branching and encircling its host plants. Dodder is truly parasitic and obtains no nourishment from the soil or the air as do other plants. The plant is quite leafless and is entirely without the green colour usually associated with non-parasitic plants.

The whole existence of dodder, therefore, depends on that of its host plant which is gradually deprived of its nourishment. This action frequently results in the complete death of portions of red clover or lucerne stands. Dodder produces a large number of small white flowers, each of which produces some four seeds, very similar in size, shape, and weight to that of white clover. On this account the dressing of dodder seed out of a line of white clover is often difficult except by the use of special seed cleaning machinery consisting of an endless belt of velvet running over staggered rollers. This velvet throws off the clover and retains the dodder seed. Nevertheless the saving of clover seed from dodder infested paddocks is to be condemned as it is liable not only to reinfest the paddock but also to spread this pest far and wide.

Control methods should aim at the prevention of the dodder having a chance to reseed. This may be accomplished by keeping affected areas closely mown or grazed. Sprinkling with a 5 per cent. mixture of sodium chlorate and limestone will kill the host plant as well as the dodder, thus effectively preventing the dodder im-

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mediately re-establishing from dormant seeds.

On small areas control may be effected by cutting the attacked patches and burning the cut herbage in a heap of straw on the attacked area.

These methods will probably ruin that part of the pasture but the damage thus done is not comparable with the damage that might take place due to the neglect of affected areas.

Fat Hen (*Chenopodium album*) is one of the commonest and most widely distributed of our annual weeds, and is most abundant in those districts where arable farming is carried out. As it germinates in the late spring, it is serious only in spring sown crops and pastures. In root crops it may, if unchecked, reduce the yield considerably by virtue of its vigorous competition and smothering effect on the young plants.

The amount of fat hen may be reduced somewhat by several thorough but light surface cultivations before sowing. This allows the seed to germinate and be killed. Deep cultivation should be avoided at this stage, as it will only bring up more seeds. When once established in the crop itself the only remedy is in the hoe.

The flowers of fat hen are green and inconspicuous and the fact that it has flowered is often overlooked. This combined with the fact that the seeds ripen while the plant is still green is no doubt responsible for the lack of appreciation of the knowledge that early eradication is essential. The pulling of nearly mature plants and leaving them lie on the ground merely reinfests the ground with a large amount of well-ripened seed.

In paddocks known to be badly infested with fat hen every endeavour should be made to avoid the spring sowing of slow-growing crops.

In the sowing down of pastures on fat hen country autumn sowings should be carried out where this is not inimical to the welfare of the grasses and clovers. When fat hen is serious in spring-sown pastures early grazing by sheep or topping with the mower is advisable, in order to avoid a serious smother. Being a fairly palatable and an annual plant, fat hen is seldom seen in a pasture after the first year, when all the surface seed has germinated.

Fumitory (*Fumaria officinalis*).—A fairly widely distributed annual weed that is serious only in isolated localities where the fertility and rainfall are fairly high. It is of a training habit and grows to a height of a foot or more under good conditions. The leaves are hairless and deeply divided. The flowers are about half an inch long and are of a purplish pink colour.

Fumitory is a serious weed in isolated localities where it competes strongly with slow growing spring sown crops.

Fumitory is a hardy annual plant and establishes readily in both spring and autumn and in sheltered parts will flower throughout the winter. It is usually of serious moment only in slow-growing spring-sown crops such as pasture and root crops. If lucerne is sown too early fumitory is sometimes troublesome.

The methods for the control of fumitory are similar to those recommended for fat hen.

Redshank (*Polygonum persicaria*).—This plant is known by a variety of names such as red root, crucifixion weed, and calvary weed, the two latter names being applied on account of the presence of a dark red mark on each leaf. The stems of the plant are usually red, particularly towards the base, whilst other parts have a reddish tinge. The flowers are small and are pink, and give rise to triangular black seeds.

It is chiefly on heavy country and in wet seasons that red shank is a serious weed in crops such as turnips.

Following a wet summer its effect is particularly marked as wet conditions not only favour its growth but also frequently render sufficient intercultivation of root crops impossible.

On lighter country redshank is seldom of much moment, as under drier conditions the amount of growth and consequent smother is comparatively small. Control measures consist of avoidance, where possible, of spring sowing on infested ground, early hoeing of root crops, and mowing of young pastures.

Shepherds Purse (*Capsella bursa-pastoris*).—A free seeding annual weed of wide distribution. As with most other annual weeds, it occurs chiefly in spring-sown crops. As it does not grow very tall its smothering effect is not as serious as that of many other weeds, except when the sown crop is very slow to establish.

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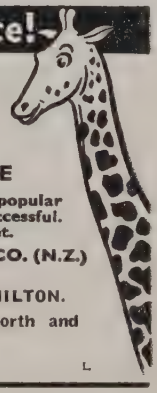
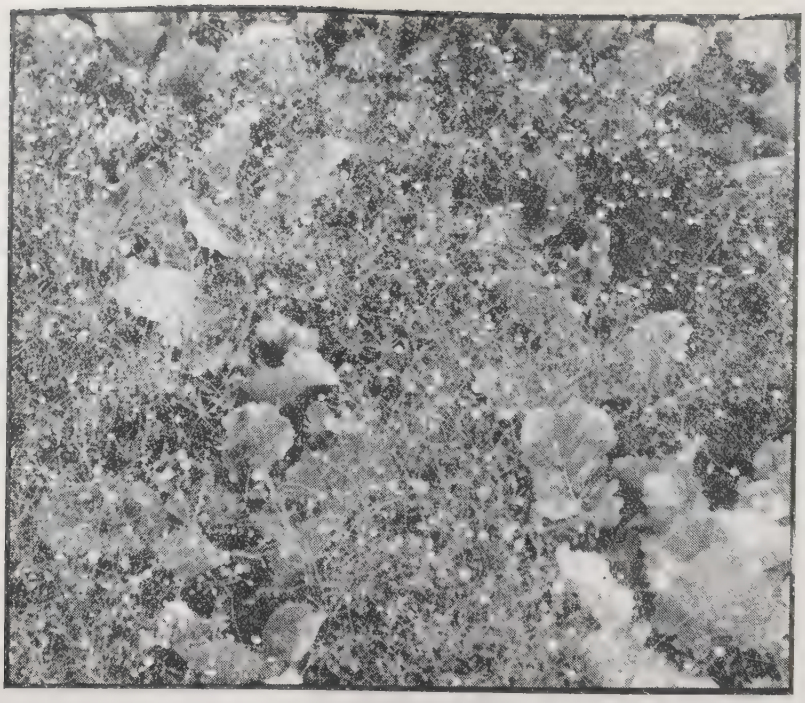




Spurrey is a serious competitor in spring sown crops, particularly on the clay soils of the south.

In some districts lucerne is adversely affected by shepherd's purse when it is establishing. Fairly close cutting with the mower is then advisable. On the whole shepherds purse is one of the less serious of our weeds, although it is exceedingly common.

Shepherds purse is a fairly deep-rooted annual plant. In the early stages the leaves lie prostrate on the ground. The flower stems are branched, lightly leafed, and grow to a height of about one foot. The flowers are small and white and give rise to the typical purse or seed capsule. This is heart-shaped and when ripe splits in half along the flat sides.

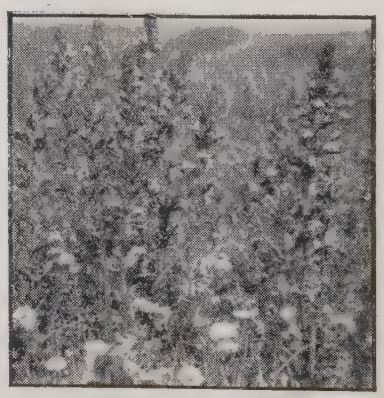
Spurrey (*Spergula arvensis*) is also called yarr or even occassionally in error, yarrow. It is fairly well distributed throughout the country, but is most common on lime deficient or acid soils, and on this account it is particularly common in parts of Otago and Southland, where it is sometimes serious in spring-sown crops, such as swedes and turnips, especially if the season is wet. It also causes considerable smother in spring-sown pastures, if the grasses do not make a vigorous start.

The inclusion of Italian ryegrass or western wolths in spring-sown pastures helps considerably in combating spurrey. The only method of controlling spurrey in root crops is by the hoe. Striking and then killing the weeds before sowing is of considerable assistance. In pastures spurrey is of no moment after the first feeding off. Sheep eat it quite readily and do well on it. After this the spurrey dies.

The seed of this weed, in common with several others, notably fat hen, will remain dormant in the soil for many years and will reappear when ploughing up very old pastures.

Spurrey is a sprawling, white-flowered and much-branched annual with fine, needle-like leaves which grow in clusters round the stem.

Tarweed (*Bartsia viscosa*).—An erect yellow-flowered and rather sticky annual plant which occurs throughout the country in moist and acid soils. It is a slow-growing plant and is seldom of much account in root or cereal crops. In pastures that have got away tarweed is sometimes very prominent and exerts a slight smothering effect.



The presence of tar weed in large amounts can usually be regarded as an indication of sour, damp conditions.

As it is not eaten by stock the mower is the only remedy. It is of interest mainly as an indication of sour, damp conditions, whether it occurs on flat or hilly country. Tarweed is an erect, single stemmed, and somewhat sticky plant with yellow tubular flowers.

Toad Rush (*Juncus bufonius*).—This plant is common and troublesome only on heavy wet soils. Although the plant

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6. Will bond 100% with plaster, cement, mortar, concrete, metal, wood, stone, bricks, glass, paper, cork, tiles, etc., etc.
7. Can be applied to green concrete.
8. Non-inflammable.
9. Entirely cold application and requires no preparation.
10. Odourless.
11. Does not contaminate water and is non-injurious to fish, plant, or animal life.

Left.—Wire weed is essentially a weed of late spring sown crops. When fully developed it is very tough in all its parts and is consequently very troublesome to eradicate with the hoe. *Right.*—Winged thistle is an annual weed and is most common on dry country where it often gains entry into pastures.

is compact and short it offers vigorous competition to both autumn and spring-sown root and cereal crops in the wettest portion of paddocks.

Except in the wettest hollows in pastures it is of little moment, as it is soon overtopped by the vigorous growing grasses and is later eaten out by stock or dies off during the early summer. On account of its short growth it frequently reseeds and re-establishes in the dampest pastures. Efficient drainage and the sowing of suitable plants will do much to control this weed in pastures.

Toad rush is a wiry annual plant growing about 6 inches in height and in appearance is somewhat similar to the ordinary rush in miniature except for the fact that the seed head is branched.

Wireweed (*Polygonum aviculare*).—This is also sometimes referred to as knotgrass or knotweed. It is an annual plant with a slender but very tough taproot. The stems, of which there are many, are also very tough. When growing without competition from other plants wireweed assumes a prostrate habit and a pure association of this plant will form a dense cover on the ground about an inch or so in height. When growing in competition with other plants, however, wireweed assumes a more erect habit. When mature, wireweed, like many other plants of the dock family, turns a dark reddish brown colour.

Wireweed is essentially a weed of late spring sowings and is common throughout the country. It is most harmful in root crops such as mangolds and turnips, as it germinates readily at the time that these are usually sown. Control in root crops consists of thorough cultivation before sowing and the hoeing of the crop when the weed is in the seedling stage. If allowed to grow at all large elimination of wireweed is difficult either by hand or horsehoe. In any case hoes must be very sharp to enable it to be cut without an unnecessary waste of effort and time.

In pastures wireweed is of little consequence except in the first year, when it may sometimes exert a marked smother. The inclusion of quick-growing plants such as Italian ryegrass and a reasonably heavy seeding will do much to check it.

Winged thistle (*Carduus pycnocephalus*).—Star thistle is also a name commonly applied to this plant. It is an annual, growing up to about three feet in height. The leaves are very prickly, whilst on the stems are leaf like prickly protrusions or "wings."

This plant provides a good example of the definition of a weed. On first and second-class country it certainly is a weed plant, as its presence results in a loss to the farmer through occupying ground that is required for other plants. On the other hand on some of the poorer country such as the depleted areas of Central Otago it is regarded as being of considerable value on account of the quantity of poor although very useful feed it produces.

In the control of winged thistle little can be done except the prevention of seeding. On good country it is seldom present, let alone serious. On second-class land it comes and goes with the seasons and is often of frequent occurrence in damp seasons in pastures that have been dried out badly the previous year.

(To be continued).

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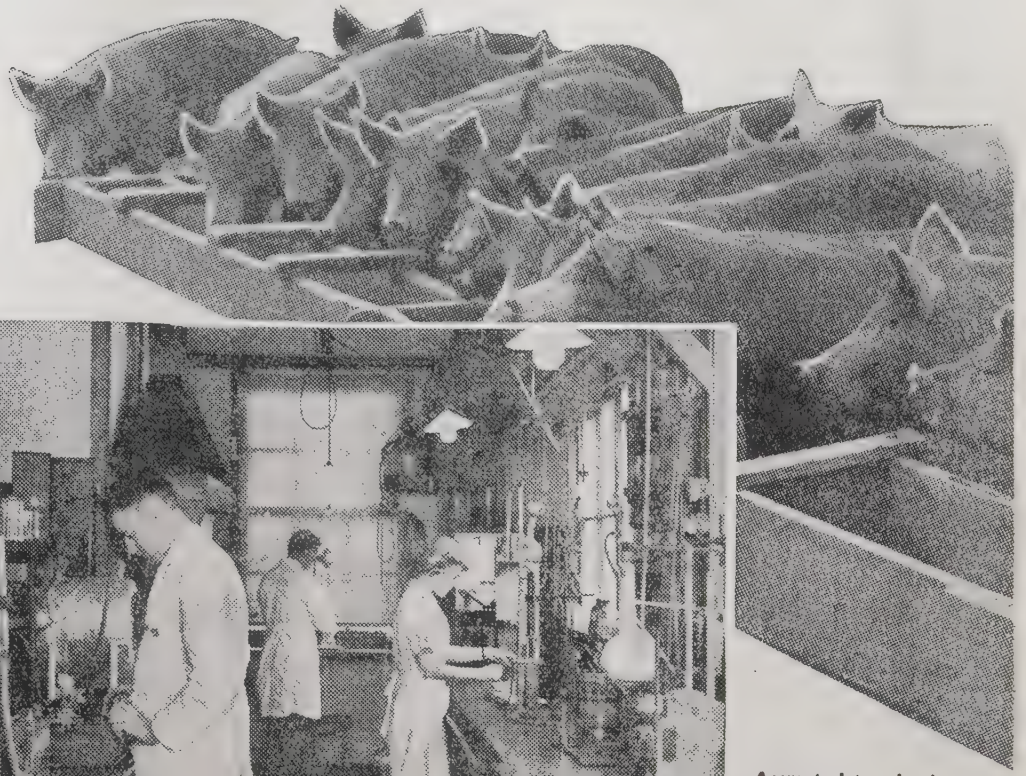

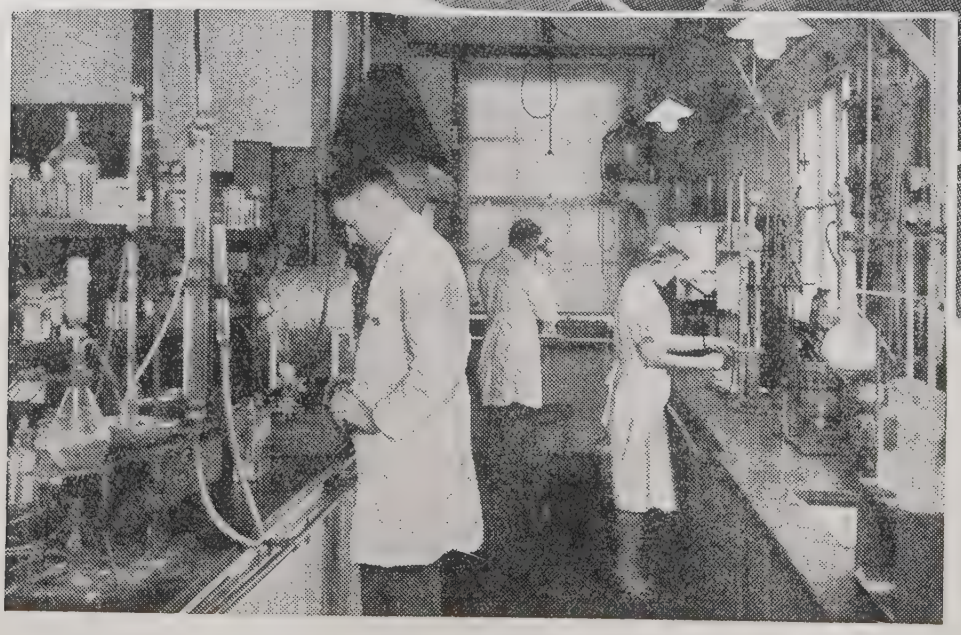

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Whey for Pig Production is Worth One Porker Per Cow

Contributed by the Livestock Division.

DUE to the ever-increasing demand for pig-meats by the armed forces in the South Pacific there is an urgent need to utilise all the available feed supplies. Whey, the by-product of cheese factories, is a valuable pig feed, and has great possibilities when used judiciously with other feeds. In estimating the value of whey as a pig feed consideration must be given to the necessity of building up the feed value to at least that of other high-quality feeds such as skim-milk, barley, etc. To do so not only reduces the quantity of whey fed—farmers are familiar with the ballooned appearance of pigs fed on bulky feeds—but it increases the efficiency of the whey. Consideration must also be given to the economics of doing this. The cost and quantity of the concentrates used are important, but these are not such vital factors in the successful use of whey as many would have us believe.

Feed Values

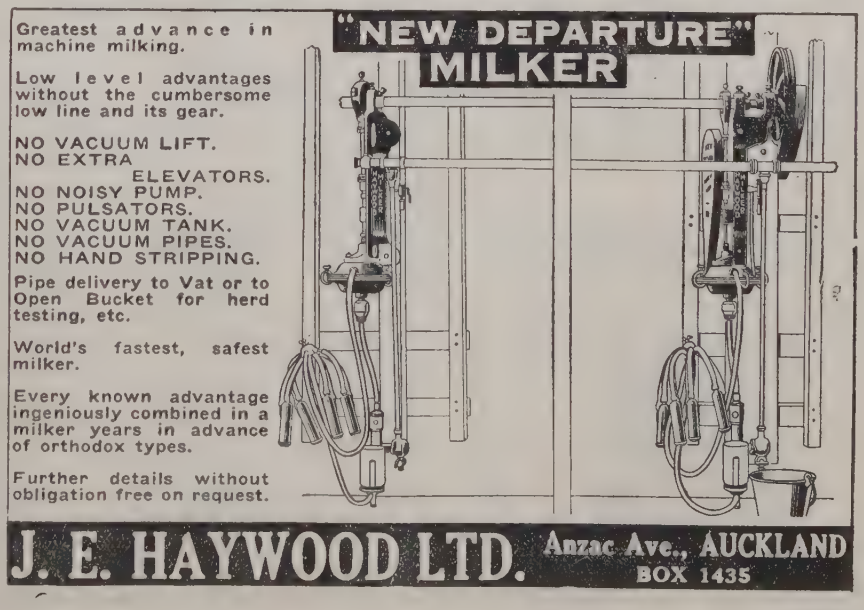
On analysis, whey contains about 6.5 per cent. of solids as against average skim-milk at about 8.7 per cent. Gallon for gallon, it therefore has about three-quarters of the feeding value of skim-milk. Out of every 100 gallons of milk that go to the cheese factory there are only about 75 gallons of whey returned. Consequently, when allowance is made for the lower solid content and lower quantity available, the whey from a herd of cows is about half as valuable as the skim-milk from the same herd. Most people know that fact, but do not know how it is arrived at. From it they reasonably argue that if whey is only half as good as milk you have to feed twice as much of it. Pigs overfed on whey go to the pack. The feeder is disappointed, and decides that whey is not worth using.

How to Feed Whey

Gallon for gallon, whey is three-quarters as good as milk, but since either may be used in a variety of ways ranging from good to bad, the above comparison is right only when both are used to the best advantage. Whey is short of protein, and generally it is necessary to use meat-meal along with whey to get the best results. You cannot replace three-quarters of a gallon of milk with one gallon of whey alone, but when meat-meal and whey are used together the return per gallon of whey, after paying for the meat-meal used, is three-quarters of what could be obtained for milk. The methods of using whey with different classes of stock are set out below.

Sows.—When there is plenty of grass, in-pig sows will do with as little as 2 gallons of whey and 1lb. of meal. In the absence of grass they may want 6 gallons of whey and 2lb. of meal. To build sows up before farrowing, give them up to 10 gallons of whey and 2 to 3lb. of meal, mainly meat-meal. After farrowing, give them 3lb. of meal and 10 to 20 gallons of whey, depending on the capacity of the sow and the size of the litter, reaching the peak ration when the litter is 7 to 10 days old. When the pigs are well started to feed out of the creep, it will be found possible to reduce the concentrate to the sow. **In this, one must be guided by the condition of the sow.**

The Litter.—Suckers will start to forage for themselves any time from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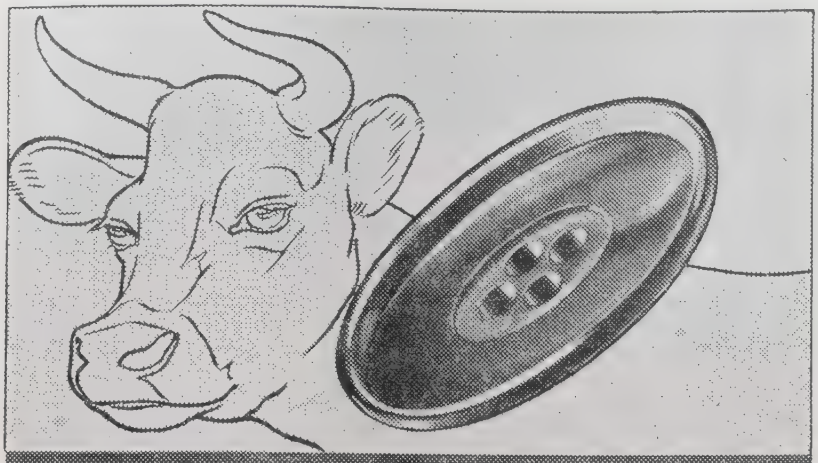

Button, Button - find the Button

When New Zealand housewives began to find the humble button becoming rarer daily, they might have said "Can't something be done about it?" Something was. New Zealand manufacturers began to produce buttons from a hitherto worthless by-product —the horns of cattle.

Again industry provides an example of the native skill and initiative of the New Zealander. The purely New Zealand Life Office, the Dominion Life, demonstrates its faith in New Zealand by confining all its activities to this country, investing its assets in New Zealand and operating on New Zealand capital. As the Dominion has grown, so has "New Zealand's Own Life Office."

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14 days of age. It is first noticed by their attempts to obtain food from the sow's trough. This, then, is the time to establish the "creep." Meat-meal, barley, or maize, anything that will encourage them, will serve the purpose of starting them off. These feeds should be fed dry for a start, as dry feed will encourage them to look for a drink. Whey should be available to them at the same time in a separate trough. At the commencement they will eat but a small amount of meal, perhaps two or three ounces per pig, and about 1 pint of whey. This will gradually increase until at weaning the quantities will be ½ to ¾lb. of meal, and up to 2 to 3 gallons of whey, according to the size of the weaners. At this stage most of the meal will have been added to the whey; thus the weaners are used to the method to be followed after weaning.

Weaners and Stores.—The usual practice followed when feeding weaners and stores is "a little and often," four or five times daily. The meals should be mixed with the whey at the time of feeding, and **not**, as is sometimes seen, where the daily allowance of meal is put in with the bulk of the whey on its arrival at the farm from the factory. This is not a good practice, and results in the first pens of pigs fed getting all whey and the last pens most of the meal. In any case, it increases the possibility of fermentation, which reduces the feeding value of the whey. Pigs from 40 to 100lb. live weight should receive from 3 to 5 gallons of whey, and ½ to 1lb. of meal. Meat-meal should never comprise less than half of the meal.

Porkers and Baconers.—Between 100 and 200lb. live weight, the ration of whey will be increased up to 8 gallons and 1lb. of meal. Pigs of all ages on whey do better when allowed access to good grazing conditions. The grass provides the small amount of fibre necessary, and the exercise aids digestion.

The following table provides a simple guide:—

	Whey.	Meal.
Sows, before farrowing ..	6 to 10 gals.	2-3lb.
Sows, after farrowing ..	10 to 20 gals.	3-4lb.
Litters, per pig	1 to 2½ pts.	2-8oz.
Weaners and stores	2½ to 5 gals.	½-1lb.
Porkers and baconers	5 to 8 gals.	1lb.

The feeder must exercise his judgment and be guided by the appearance and behaviour of the pigs. Some pigs will utilise whey better than others.

Care in Whey Feeding

Scours are more likely to be associated with whey feeding than with any other dairy by-product.

Overfeeding should be avoided by feeding frequently at regular intervals. This will prevent digestive troubles. Lack of suitable concentrates is also a factor. Meat-meal plays an important part in the use of whey.

Stale acid whey can also cause pigs to scour. A small handful of ground limestone to every 40 gallons will correct the acidity of whey, and at the same time provide a very necessary mineral to the pigs. Too long a period between feeds will cause them to gorge and bring on scouring, giving them at the same time that unsightly pot-bellied appearance. Wet and dirty sties can be remedied by dry bedding, care, and attention. Where scouring persists it can be controlled by feeding grain-meal dry, using Parrishes' Chemical Food, or lime and cod-liver oil.

Pigs on whey should have access to grass where possible, especially older pigs. Grass provides useful roughage and minerals, it tends to limit the whey intake, and so prevents indigestion associated with undue distension of the stomach, it tends to keep the yard cleaner, and it provides the useful exercise that maintains health. Grass cannot take the place of meals, but where possible it should be used along with whey. The mineral needs of pigs depend upon the kind and quality of feed used. Where pigs have access to good grazing, little other than lime is needed.

The position is altered, of course, when they are confined to sties. The best mineral to use with whey is ground limestone put in the whey, as already stated. The most important thing to do with whey is to feed a little and often. Three feeds a day would be sufficient where a good concentrate ration is fed, but four feeds would be better.

The practice followed by many is to feed before milking, after milking, midday, and again before and after milking at night—five times daily, the concentrates being fed only twice, after milking in the morning and before milking at the evening meal. However, much depends upon the amount of whey available and the quantity of meals used. One final word: it often happens that when whey is in short supply at the factory because somebody is taking more than his share, the whey is diluted with water. See that this does not happen at your factory. Diluted whey gives disappointing results.

Whey Feeding Trials

As evidence of the value of whey, and the ways of using it along with meals, it is useful to quote the examples of actual feeding trials conducted on farms.

The first case refers to the litters of five sows, 34 piglets.. The 34 pigs were carried to a total deadweight of 2,739lb.—an average of 80lb. of carcase per pig, which was reached in 129 days, or in just over four months. The feed consumed by the sows and their litters during the trial was 15,300 gallons of whey, 1,590lb. of meat-meal, and 790lb. of barley. Debiting the litters with the feed consumed by the 5 sows, the average amount of feed used per pig during the 17 weeks of the trial (birth-to-slaughter) amounted to 450 gallons of whey, 56lb. of meat-meal, and 29lb. of barley.

The value of the meat produced at 6d. per lb. was £68 9s. 6d., the cost of the meals used, 1,590lb meat-meal, 790lb barley, at £14 and £9 per ton respectively, amounted to £13 9s. 6d. This cost, deducted from the gross return, shows a net return of £55 for whey fed, showing this much-despised by-product to be worth ¾d. per gallon.

In the autumn it is not uncommon to see slip and light store pigs sold in saleyards at sacrificial prices because of a shortage of whey. The owner will reason that meal is too dear at £14 a ton to feed to pigs and show a profit. Here is an example of

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what can be done when a little good concentrate is purchased.

6 LITTERS—48 PIGS.

	£	s.	d.
In March, 24 pigs at 10 weeks sold for 12/- each	14	8	0
The other 24 pigs were finished on whey and meat-meal and sold in May at 35/- each, i.e.	42	0	0
The cost of the meat-meal used, 1,280lb. for the seven weeks' feeding at £14 a ton was	8	0	0
This deducted from the value of the pigs leaves	34	0	0
When the value of the pigs in March is taken from this	14	8	0
The value of the whey, 5,040 gallons used, was	19	12	0

On these figures, whey returned nearly 1d. per gallon.

The story behind this trial is interesting, because the owner intended to sell all the pigs in March, there not being enough whey to finish them. It was pointed out, however, that with the addition of meat-meal the whey could be profitably used to finish at least 24 pigs. After seven weeks' feeding the value of the pig was increased from 12/- to 35/- at a cost of 7/- per pig.

Ten other trials were carried out on whey about the same time, in which 93 pigs were recorded.

The weight of the pigs when 8 weeks old at the commencement was 40lb. a pig. After a period of 59 days' feeding the weights had increased by 56lb a pig, a total increase in 59 days of 5,227lb. During the period under trial, 22,000 gallons of whey and 4,026 lb. of meat-meal were fed.

	£	s.	d.
The live weight produced was equivalent to 3,484lb. of pig-meat at 6d. per lb, returning	87	2	0
The cost of the meat-meal used, 4,026lb. at £14 a ton	24	10	0
The value of the 22,000 gallons of whey fed during the trials was	62	12	0

Whey in these trials showed a net return of approximately ¾d. per gallon.

Results

Litter production with whey has also given excellent results. Information collected in the course of litter recording during recent years has thrown considerable light on this aspect of pig production. The information assembled shows that of the 136 sows recorded 941 pigs were reared, an average of 7 pigs per litter, with an average weight at 8 weeks of 37lb. per pig. During the period between farrowing and weaning, a sow and litter consumed 1,000 gallons of whey and 200lb of meat-meal. With meal at £14 per ton, the cost of rearing 7 pigs to the weaning stage was 28/-, or 4/- per pig, for 8 weeks' feeding. These costs are actually very little in excess of those obtained with skim-milk. When the litter records of 136 sows are coupled with the feed trials of 93 pigs, the results show that a 72lb. carcase of pork is produced for 386 gallons of whey and 74lb. of meal. On this basis, one pound of pork is produced from 5½ gallons of whey and 1lb. of meat-meal. With pork at 6d. lb. and meat-meal at 1½d. lb. (£14 per ton), the return for the 5½ gallons of whey fed is 4½d., or over ¾d. per gallon.

Summary

Most people regard whey as unsuitable for pig feeding, judging its value by its watery appearance. In point of fact, it has at least two-thirds the feeding value of skim-milk. Both these by-products are improved by the addition of concentrates, particularly so in the case of whey. It is no exaggeration to say that good results will be obtained only when some protein concentrates (meat-meal) are used with it. In addition, good grazing materially assists in obtaining profitable results by reducing the amount of whey required in the production of pig-meat. This, in turn, increases the number of pigs that can be carried on a given quantity of whey. While the change-over from butter to cheese recently experienced will reduce the number of pigs which can be fed, the fewer pigs can be fattened just as efficiently on whey as with skim-milk. when the right kind of meals are used judiciously with the whey.

The right kind of meal does not mean the cheapest one can buy. In the trials it will be noticed that meals have been costed at **£14 per ton**, while returns for pig-meat are shown at **6d. per lb.** Present schedule ranges from 7d. to 7½d. per lb., and meals are quoted at £9 15s. per ton for barley-meal, £10 14s. per ton for wheatmeal, and meatmeal still selling at £13 per ton. Whey today is an embarrassment to our dairy factories—make it *work for victory.*

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CALVES do BEST on MOOSE

Eradication of Gorse

Experience of Northland Farmer

— By —
P. S. SYME,
Instructor in Agriculture,
Warkworth

IF asked which they considered to be the worst and most objectionable weed in their district, many Northland farmers would unhesitatingly give pride of place to gorse. To farmers in other districts this choice might appear strange, and many—with painful experience of ragwort and blackberry—might be inclined to congratulate the Northlander if he has no worse weed than gorse to contend with.

Nevertheless, gorse in the warm northern climate is a very different proposition indeed from gorse further south, a fact which many in-comers have proved to their sorrow. Simple methods of control, found quite efficacious elsewhere, have here merely served to demonstrate their utter futility.

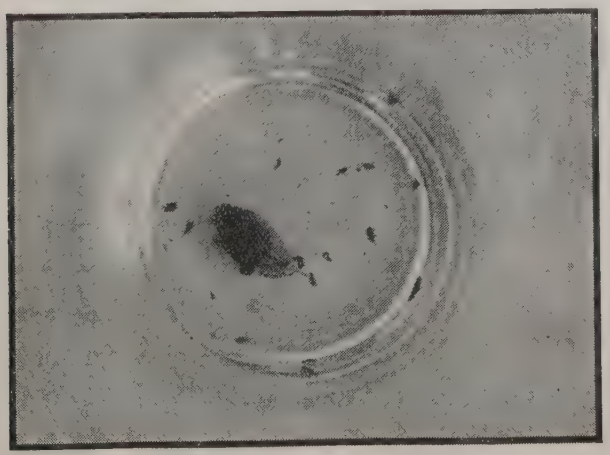
Destroying Gorse

Which is the best method of destroying gorse? Many have asked this question, and many entirely different answers have been received. Farmers in the North have tackled the problem of clearing gorse-infested land by many widely divergent methods with varying degrees of success, and so far, no standardised technique has yet been evolved. It is true, however, that the most suitable method of eradicating gorse must depend on a variety of factors. The area and type of gorse, the nature of the soil, the contour of the land and the resources at the farmer's disposal all must be taken into account before reaching a decision.

Liberating gorse weevils on a gorse infested area. These insects do not attack the gorse itself, but may destroy as much as 95 per cent. of the seed. In this way they do much to prevent the pest from spreading to clean land.

Farmer's Experience

To farmers confronted with a gorse problem, the experience of Mr. S. Edwards, Warkworth, may prove of interest. In 1920, Mr. Edwards took over a farm of 230 acres. Of this area, about 40 acres was in tall gorse. The balance, also gorse infested, had been ploughed and sown in grass. At the time of taking over Mr. Edwards had only a nodding acquaintance with gorse, and was in no way perturbed. During the first year, the recently sown grass reverted to a solid smother of seedling gorse, and the position began to look serious. A specially designed machine for cutting the gorse was imported, but met with no success. Heavy salting of the area and the application of caustic potash were also tried, the only visible result of the latter being one dead cow. After four ineffectual years the situation became desperate, and Mr. Edwards decided to attack the gorse from a fresh angle.



Shows adult gorse weevils. The size of the insect may be judged by comparison with the gorse seed pods.

Seeds the Main Trouble

Recognising that his main problem was how to prevent regeneration from the smother of seed already in the ground, he did some hard thinking. Obviously, it was not possible to destroy the seeds, and they must therefore be encouraged to germinate. Since it was evident that it was easier to kill the plants in the mass by cultivation at the seedling stage, than to grub out each one laboriously by hand later on, he decided on a system of fallowing, accompanied by repeated cultivations.

Further thought suggested that if the land were ploughed deep only once, to bury as much of the seed as possible, the problem would be greatly simplified. Gorse seed, reasoned Mr. Edwards, like any other seed, requires light and air to enable it to germinate, and any seeds buried deeper than about 2 inches need cause no further trouble, provided they are not brought to the surface by subsequent cultivation.

Accordingly, a new campaign was started. Work began with the clear-

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Left.—Grubbing gorse by hand. This is the method commonly adopted wherever the gorse is not too dense on infested pastures. *Right.*—Showing the effect of burning gorse. The heat generated by the burning appears to assist the germination of the seeds, and promotes regeneration.

ing and burning of a block of gorse, care being taken not to tackle more than could be efficiently and thoroughly coped with. This area was then deep ploughed once. After this, every effort was made to induce the seeds near the surface to germinate, and to destroy the small seedlings by light surface cultivations. Care was taken as far as was practicable to avoid bringing up fresh seed from below about the 2-inch level, and to keep the surface well stirred so as to kill the plants at the most delicate stage and induce more seed to germinate.

Used of Mixed Smother Crop: On some areas, the land was cropped to provide supplementary feed which would also act as a smother crop, the best results being obtained by a mixture of turnips, rape and mustard. This was later fed off by sheep and lambs.

Importance of Long Fallow: The period devoted to fallowing varied from one to two years, depending on the quantity of gorse seed present. The importance of making absolutely certain that the surface soil was reasonably free of gorse seed however, was fully realised, and Mr. Edwards was quite convinced that even an extra year of fallowing would be more than justified by the smaller number of gorse plants which would later require to be hand grubbed.

Vigorous Pasture

When satisfied that the land was clean, Mr. Edwards sowed the area in permanent pasture in the autumn. Appreciating the value of a vigorous pasture as a smother crop, he devoted special attention to the preparation of the seed bed, the generous application of lime and phosphate, and the sowing of about 40lb. per acre of a well-designed mixture of good quality seeds.

Provided the fallowing treatment had been sufficiently thorough, it was found that the amount of gorse appearing in the young pasture was surprisingly small and could be dealt with by hand grubbing. As a result of the long fallow and the careful preparatory work, grass growth was very rapid and was further encouraged by a topdressing in the spring, special attention being devoted to any exposed knolls on areas where the natural fertility was lowest, it being found that the higher the fertility the easier it was to beat the gorse.

Mr. Edwards emphasises that even after the most careful and thorough fallowing, some gorse still appeared in the grass. This was tackled resolutely by hand grubbing, and it was found that the amount of hand grubbing required decreased progressively each year, until by the fourth year, only a few odd plants still appeared in a field.

Practice Justified

By careful and thorough work, by consolidating the position won each year before deciding on the size of the next block to be attacked, Mr. Edwards gradually won through to a clean farm. The work was prolonged and by no means cheap, but that it has been justified by results is clearly to be seen in the excellent gorse-free pastures on the farm to-day, as well as by the greatly increased carrying capacity.

When first taken over, the property was hard pressed to carry 200 sheep and 30 cattle, and even at that the mortality rate was high. The farm can now winter about 1,300 head of sheep and 20-30 head of cattle. About 80-90 head of cattle are carried in the summer, and each year approximately 1,300 fat sheep and lambs are marketed, along with about 50 head of cattle.

Economic Proposition

Mr. Edwards pays tribute to gorse as a well-armed and resolute adversary, and one not to be too lightly challenged. While admitting that the work of eradication was both protracted and costly, he himself at that time had everything to learn. With the experience now gained, however, and with the advent of cheap mechanical power, he is quite confident that even the worst and most densely infested areas of gorse can be economically grassed wherever the land is ploughable.

To some, the period devoted to fallowing may appear excessive, but experience has shown that if the fallowing has been inadequate, more gorse comes up in the pasture than can be economically grubbed. With a measure of patience, perseverance and a proper understanding of the problem involved, gorse eradication is relatively easy. Haphazard, ill-conceived efforts of control on the other hand, inevitably lead only to disappointment, and sooner or later, the gorse is again left in triumphant possession of the field.

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Conservation of Farm Machinery

Electric Motors on the Farm

ANY unit of farm equipment is important today—the war has made replacement difficult. The care and maintenance of all types of farm machinery is a national duty. This article gives an insight into factors concerning the operation and maintenance of electric motors, of which over 65,000 are in use on New Zealand farms. The practical information in this article should assist farmers in taking the best possible care of their equipment, making it last longer and do more work in producing foodstuffs for the fighting forces. All farm machinery should be inspected regularly and kept in the best possible condition. Knives on cutters should be kept sharp and properly adjusted. Shafts should be correctly aligned and bearings well lubricated.

Proper operating speeds are important, for excessive speed is not only dangerous, but wastes power and may destroy the machine. This can be avoided by the proper selection of pulleys, as explained later. The manufacturer's recommendations for machine and belt speeds should be carefully followed. All repairs and adjustments to electric motors and other electric appliances must be carried out by a registered service electrician.

The following points should be found useful by assisting motor users to avoid troubles which may occur from lack of proper attention:—

Electric motors are indispensable for operating machines used on the farm, as a ¼ to ⅓ horse power motor will do as much work as a man when operating a crank. With reasonable care electric motors should give 25 to 30 years of low cost, trouble-free service; but with improper care a motor may wear out in a year or burn out in a few minutes.

Unlike an internal combustion engine, which stalls when overloaded, the electric motor will continue to work, even when overloaded, and run until its winding insulation goes up in smoke. The motor user will be amply repaid if he has his motor equipped with a thermal type overload device. The cost will be small, and will permit the operator to forget about over-load danger. This device will stop the motor when it is too hot.

Standard Sizes

Motors of various manufactures are standardised as to sizes, voltage, speed and type, and usually to the base and pulley dimensions. Motors can be purchased in sizes of ⅙, ¼, ⅓, ½, ¾, 1, 2, 3, 4, 5 and 7½ horse power, usually in either 1,450 or 960 revolutions per minute, and for either 230 volts single phase or 400 volts three phrase.

The table below is useful for selecting motor sizes. Be sure to use the proper voltage.

It is important in selecting a motor for a given duty to get one suited to the machine it is to drive. By doing so it is frequently possible to use one of less horse power than would be feasible if any motor which chanced to be readily available were used.

Certain types of loads require motors with high starting torque. A deep well plunger pump is an example of this type of load. When the water column is high the motor must not only overcome its own inertia, but that of the pump mechanism and the water as well. It must really start more than its full load. The same thing may be said for a positive action pump. The centrifugal pump assumes its full load as operating speed is approached.

Technical Terms

For the convenience of readers a brief list of technical terms, simply explained is given:—

Ampere: A unit used to express the rate of flow of electricity. It is 1

COMMON USES FOR ELECTRIC MOTORS ON THE FARM.

Machine to be driven.	Motor Sizes. H.P.	Most Used. H.P.
Cream separator	¼ to ⅓	¼ to ⅓
Churn	¼ to ⅓	¼
Washing machine	¼ to ⅓	¼
Private fruit cool store refrigeration	7½ to 20	7½ to 20
Household refrigerator	⅙ to ½	⅙ to ½
Fruit and vegetable grader	¼ to ½	¼
Milking machine	½ to 3	½ to 3
Small concrete mixer	⅓ to ½	½
Emery wheel	¼ to ¾	¼
Drilling machine	¼ to ½	½
Wood saw	5 to 7½	5
Ensilage cutter	5 to 10	7½
Feed mixer	3 to 7½	5
Feed grinder	1 to 10	5
Water pump	⅓ to ½	⅓

coulomb per second. It is comparable to gallons per minute in discussing the rate of flow of water.

Volt: The unit of electrical pressure. One volt will cause 1 ampere to flow through a conductor having 1 ohm of resistance.

Watt: A unit of power. One volt multiplied by 1 ampere equals 1 watt. 110 volts multiplied by 5 amperes equals 550 watts; 1 horse power equals 746 watts. A more usable term is the kilowatt, which is equal to 1,000 watts. Kilowatts multiplied by time in hours equals kilowatt-hours, frequently abbreviated as kw.-hr.

Current: The flow of electricity along a conductor; its unit is the ampere.

Alternating Current: Current that flows first in one direction and then in the opposite direction at regular intervals.

Conductor: Any substance through or along which electricity may flow readily. Most metals are conductors. Of the baser metals, copper is the best conductor. Aluminium is frequently used as a conductor. Materials that will not carry current readily are known as insulators. Glass, dry air, cotton, rubber and oil are good insulators.

Inductor: The part of a conductor that passes through the magnetic field of the motor.

Simple thermal type of motor protecting device, a combined switch and overload protection available at low cost.

Resistance: The property of a conductor that offers opposition to the flow of electricity. It manifests itself as heat. For a given material, the resistance is proportional to the length and inversely proportional to the cross-sectional area. To state this another way, a conductor twice as long as another of equal size will have twice the resistance, but a conductor of equal length and twice the cross-sectional area of another, will have half the resistance. Different materials of equal dimensions have different resistances. An iron wire has from 6 to 10 times the resistance of a copper wire of equal size and length. Other materials may have even more resistance.

Magnetic Field: The space between the free ends of the poles in which magnetic force is present.

Magnetic Flux: A term which refers to the magnetic force.

Cycle: A complete change from a given value in one direction through all values in the opposite direction and back to the same value in the original direction. The number of times these complete changes occur in a second is known as frequency. The standard frequency of alternating current in this country is 50 cycles.

Torque: The measure of the tendency of a force to rotate the body upon which it acts. Example: A pull on the spoke of a wheel. A pull of 1 pound at 1 foot from the centre of rotation equals 1 pound-foot of torque.

Phase: This term, as used in practice, is applied to electric circuits in two ways and should not be confused: (1) The relationship between the current and the voltage. Certain characteristics of electric circuits cause an alternating current to reach its maximum value either before or after the voltage reaches its maximum value. (2) One or more currents flowing in an electrical system. For example: In a single-phase system but one current

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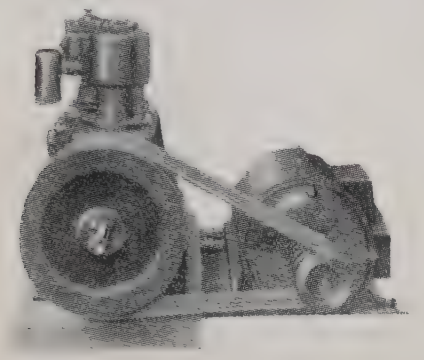
flows, while in a three-phase system three currents flow. A single-phase motor means that but one impressed voltage is required to operate it. The induced current of the rotor in a single-phase motor is not considered as constituting a second current.

Inductance: The change in magnetic flux linking a circuit when a change in current takes place. If a wire is included in the field where the magnetic flux is changing, a voltage is induced in the wire. The property which causes a current to flow through one conductor due to the influence of magnetism set up around a changing current in another conductor is known as mutual inductance.

Electromotive Force: The electrical pressure that is built up in an inductor or in a battery which causes an electric current to flow when the



Multiple V belt drive.

circuit is closed. It may be thought of as a difference in electrical pressure between any two points in an electric circuit. An analogy in hydraulics is pounds pressure per square inch, or feet head. Electrical pressure is often referred to as potential.

Rotor: The rotating part of a motor or generator.

Stator: The stationary part of a motor or generator. In most small motors the stator contains the field windings. In larger motors and generators the rotor may contain the field poles.

Pole: That part of the motor magnetic circuit around which the field windings are wound. The purpose is to confine the magnetic flux to give locations within the motor since iron will support many times as much magnetism as the same volume of air. The pole in the alternating-current motor is made of laminated iron.

Commutator: A device which changes the direction of the flow of electricity through the rotating part. It consists of narrow copper bars insulated from each other by layers of mica. The ends of the rotor windings are soldered to the commutator bars or segments.

Brushes: Small carbon blocks which make contact with the commutator of an electric motor. These are used to carry electricity from the stationary to the rotating parts of the motor.

Condenser: An electrical device consisting of two or more electric conductors or plates separated by a thin insulating material, in which an electric charge may be stored temporarily.

Power Factor: A term which expresses the phase relationship between the current and the voltage. Unity power factor denotes that the current and voltage are in phase; that is, arrive at the maximum value at the same time. It is the ratio of real power to apparent power. Direct current is always in phase with its voltage.

Influencing Factors

Factors which have influenced the farmer to install electric motors are:

1. They are readily started under average temperature conditions, cold weather presenting no extra hazard.
2. Very little attention is required.
3. Electric motors possess the ability of developing two or three times

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5. Comparatively low cost of motor, its installation and upkeep, as compared with an internal combustion engine.
6. An electric motor may be fitted to any job requiring stationary power, and its compactness makes its use desirable where space is limited.

Causes of Trouble

The following points may be useful in avoiding trouble from these causes:

1. **Overloading:** If a motor is overloaded to a point where its speed is reduced, it begins to draw an excessive amount of current which generates heat. Do not install a 1 horse power motor to do the work of a 1½ or 1½ horse power motor.

2. **Lubrication:** (a) excessive bearing wear, (b) belt tension: Very little attention is required to keep the motor in good running order; but what it does require is essential. Proper lubrication is important. Only one bearing at each end of the motor needs attention; the directions of the manufacturer should be strictly followed concerning the oil and quantity required to fill the bearing chamber to the proper level with a good grade of light mineral oil (petroleum). Too much oil is detrimental, as oil must never be allowed to get into the windings. Most motors are fitted with a roller bearing on the pulley end and

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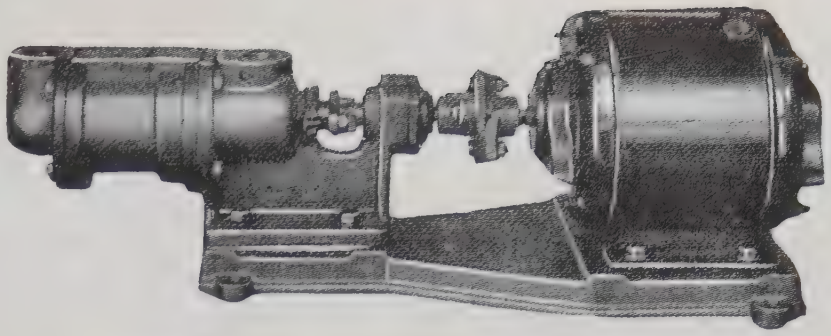
a ball bearing on the other end. These should be cleaned out and refilled with a good grade of grease about every two years. (a) Excessive bearing wear may be caused by the belt tension being too great, unbalanced, or out of line coupling, eccentric or too closely meshed gears. It may also be brought about by improper, unclean or insufficient oil, or grease or dirty bearings. (b) Belts either flat or V should have only sufficient tension to prevent slipping. V belts usually require less tension than an equivalent flat belt. Slipping of belts will cause the pulley to heat (touch), squeak (sound) or burn (smell).



Electric motor direct coupled to centifugal water pump.

3. **Pulleys and Pulley Ratios:** Belts and pulleys transmit power from motor to machine, and they change the ratio of speeds to suit the machines. The belt must be strong enough to transmit the torque, and the pulley must be large enough to prevent slipping of the belt. These factors determine the width and thickness of the belt and the size of the smaller pulley.

The ratio between the operating speed of the motor and the speed required of the driven machine determines the ratio of the pulley diameters. These relationships are as follows:—

$$\frac{\text{Motor speed}}{\text{Driven machine speed}} = \frac{\text{diameter of pulley on driven machine.}}{\text{diameter of the pulley on the motor.}}$$

Example: Suppose a feed cutter is to operate at about 600 revolutions per minute, the motor runs 1,450 r.p.m. and is equipped with a 5½-inch pulley, what size pulley must be used on the feed cutter? By substitution of values the equation becomes:—

$$\frac{1,450}{600} = \frac{\text{diameter of pulley on feed cutter}}{5.5}$$

$$\text{Hence, the diameter of the feed cutter pulley} = \frac{1,450 \times 5.5}{600}$$

= approximately 13 inches.

Because of belt slippage, speed ratios cannot be maintained exactly with belt drives. For this reason, as well as because of the cost of maintaining belts, the direct drive is preferred wherever feasible.

When a V belt is to be used the motor should be equipped with a standard V grooved pulley, the number of grooves depending upon the amount of power to be transmitted. These pulleys are made of cast iron, pressed steel, or die-cast alloy.

Shafts are machined to a standard size for a given capacity motor. If new pulleys fit the shaft too tightly, material should be removed from the pulley and not from the shaft. The set screw should turn down on to the key or flattened part of the shaft. If the key does not slide smoothly into the seat, the key rather than the seat should be corrected. Never grip the shaft with a pipe wrench or similar tool as that roughens the surface. Remove pulleys with a pulley puller, and do not use a hard material to hammer the shaft. When the pulley is to be left off the shaft, wrap shaft, with key in seat, with friction tape. Prevent rusting of the shaft by smearing a little cup grease on the surface. The grease will do no harm even if it is not all removed when the pulley is mounted.

4. **Improper Circuit Protection:** Electrical switches, fuses and circuits should be firmly fixed and protected from weather interference or other damage. Any damage should be immediately repaired by a registered service electrician.

5. **Dust and Dirt Accumulation—Importance of keeping a motor clean and dry:** A motor as part of an electric circuit is subjected to differences in potentials between windings and other parts and currents must be conducted through these windings. These coils must maintain their proper positions with respect to the magnetic flux. If, for any reason, the current does not follow its proper course, damage to the motor results. The electric current will follow the conducting wires around the coils as long as the insulation is intact; but, if the insulating materials become weak or broken the current will pass from coil to coil across a shorter path and burn the insulation. This is known as a short circuit.

Of all the materials used in a motor, the insulating materials have the shortest life. They are likely to be injured by moisture, by excessive rise in temperature, or by such substances as oil, salt, or acid. Care should be taken to keep the insulating materials clean and dry, and free from substances that will damage them. Motors that are idle are more likely to be damaged by atmospheric moisture than those in use. Motors located in damp places, such as basements, barns where animals are kept, or around milkhouses, should be of the splash-proof type. They should not remain idle for long periods. The heat and fanning action obtained by running a motor will help to keep the insulation dry.

Insulation on motor conductors contains some material that will carbonize and becomes a conductor if subjected to a high temperature. Usually the excessive temperature occurs at one spot and may not at first interfere with the performance of a motor. For this reason a motor should be inspected occasionally to see if the in-

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sulation is worn off the conductors at any place, if there are any burned places where current has been taking short-cuts, or if there is excessive accumulation of dirt or oil on the windings that might cause local heating. In case any such places are found the winding should be cleaned and repaired by a registered service electrician. The best insurance against failure of insulation is to keep motor clean and dry, and located where it will be well ventilated.

A dust-proof or enclosed motor should be used in places where it is impracticable to eliminate dust, such as in a feed-grinding room. Even under comparatively clean conditions some dust and dirt will accumulate on the windings; hence the motor should be taken down periodically and cleaned. The most satisfactory way of cleaning is to blow the dust out with a hand bellows or draw it out with a vacuum cleaner. Violent air jets from compressor tanks are likely to carry excessive moisture and may move the windings sufficiently to cause rubbing and consequent damage to the insulation. Oil films may be removed by using carbon-tetrachloride, a common chemical sometimes sold as a cleaner under trade names. Use only as much as is needed to remove the oily dirt. Exposed windings should receive a coat of good insulating varnish occasionally.

If a motor is flooded with water, it should be thoroughly dried before using. The drying should be carried out by a registered service electrician, and is done with the use of an oven in which the temperature can be controlled. The drying temperature should not be in excess of 190 deg. F. Dirt left by muddy water should be washed off with a gentle stream of clear water before the motor is dried.

Before being put back into service, the motor should be tested for grounds and short circuits in a shop equipped for making such tests. If unusual odours are noted after the motor is started, the power should be cut off immediately and further tests made for short circuits.

Keep the motor clean and well ventilated, as when operating a motor generates heat. A fan is fitted on the shaft inside the frame to force air to circulate through the motor. Dust is likely to accumulate on the fan and in the air passages around the coils and restrict the flow of air over the coils. A motor in this condition fully loaded and run for any length of time is likely to overheat and burn out. Blowing out the dust at regular intervals will prevent trouble.

6. **Trees and Hedges:** Attention of farmers is drawn to the necessity of keeping trees and hedges trimmed back to prevent contact with service lines which cause loss of time, inconvenience and damage.

The Commutator

Certain types of motors have on the revolving part a cylinder or disc made up of copper bars interspersed with strips of mica. This is called the commutator. Spring loaded carbon brushes ride on the commutator. Friction between the commutator and the brushes sometimes cuts a groove in the commutator. Keep the commutator brushes (if any) in good condition. Worn brushes should be renewed and the brush guides should be clean and free from gum to prevent the brushes from sticking. To clean the commutator use a piece of fine sandpaper (never use emery). Commutators should never be oiled or greased. These repairs and adjustments must be carried out by a registered service electrician.

Points to Note

The following may also be found useful:—

1. **Line shaft drives are not recommended for electric motors.**
2. **Ordinary fuses may not provide adequate protection; special fuses or built-in motor protection devices will often save the cost of a new motor.**
3. **The motor starting switches should be kept dry and in good repair. If switches are allowed to have loose or broken parts, or if allowed to become wet, they endanger life due to broken parts. All repairs must be done by a registered service electrician.**
4. **Magnetic switches perform the same function as knife switches. Magnetic switches, however, may be operated by remote control push buttons. The magnet merely operates to close contacts for starting the motor.**
5. **Electric motors are readily adapted to automatic control.**

Your electric motor is a highly efficient power unit. It has a long life with a minimum amount of care.

Keep bearings free of grit. Even a small quantity of grit in the grease will destroy the bearing. For this reason, in cleaning bearings handle them with care. Keep grease and oil in tightly closed containers to prevent the entrance of dust and dirt.

Economise in Power

Owing to the increase in the use of electric power for defence purposes, it is essential that farmers and others using electric motors, water heaters, radiators and radios should endeavour to assist the electric supply authority by economising in the use of electric power whenever this is possible. This can be done if motors and other electrically-operated appliances are operated during the off-peak period whenever practicable. The farmer can assist by operating water pumps, cream separator, churns, refrigerators, feed cutters, mixers or grinders during off-peak periods. (The peak periods when the use of electricity should be restricted are between 11 a.m. and noon and again between 4 p.m. and 6 p.m., milking time.)

Strict economy should be practised therefore by—

1. **Operating electrically-driven machines during off-peak periods.**
2. **Avoiding the unnecessary running of motors and leaving on of lights, radios, radiators and water-heaters in the home and milking shed when they are serving no useful purpose.**

* * *

The material for this article has been compiled by the Cool Storage Officer of the Department of Agriculture in association with officers of the Public Works Department. Acknowledgment is also made for certain material used from bulletins of the United States Department of Agriculture.

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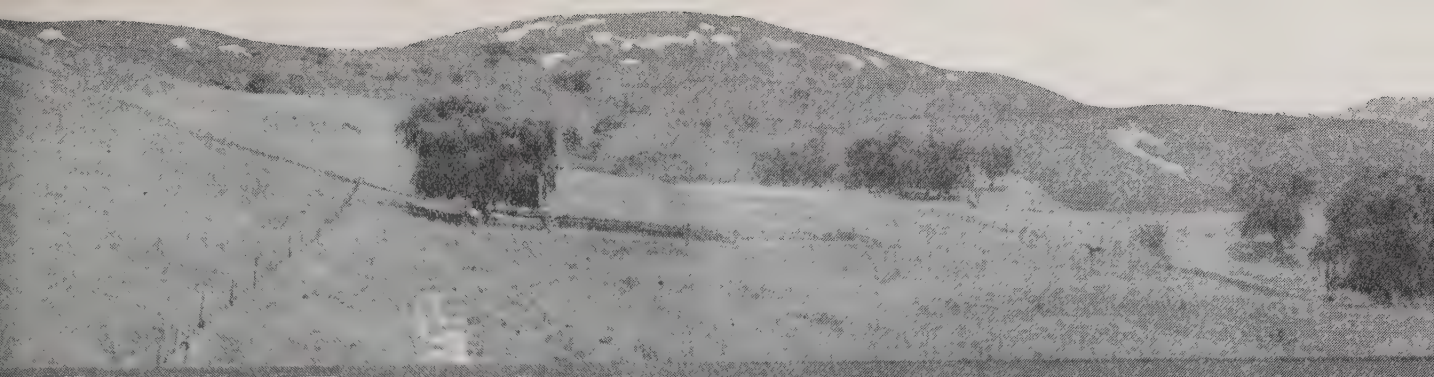

Soil Erosion—A World Problem

What is Soil Erosion?

— By —
LAI-YUNG LI,
Plant Research Bureau, Department of Scientific and Industrial Research N.Z., and Lingnan University, Kwantung, China.

SOIL is fundamental to all human activities. Certain kinds of soil give rise to certain kinds of civilisation. It affects peoples' economic problems and creates certain outlooks of life for them. Soil affects the health of man and animals through the food they eat. Deficiency or over concentration of chemical elements in the soil produces malnutrition in plants and animals, including man.

In the previous article I have pointed out that a stable, healthy, progressive civilisation requires a sound man-soil relationship, which can be properly established only when man has a better understanding and more respect for soil. In this article I shall attempt to discuss in a non-technical way the following points:—

1. **What soil is and how it is formed.**
2. **Outline of soil erosion.**
3. **Rate of soil formation compared with some examples of accelerated erosion.**
4. **Some important factors affecting soil erosion.**

1.—SOIL AND HOW IT IS FORMED.

For our purpose the soil may be defined as a natural body produced from weathered minerals, decaying organic matter, air, and water, which covers the earth in a thin layer and gives mechanical support, and in part, sustenance for plants. Physically these solid soil particles range in size from gravel through sand, silt, and clay (clay consists of particles below 2 microns—a micron is one-twenty-five-thousandth of an inch).

Soil particles 1 micron or smaller are called colloids. The clay fraction and the colloids are the "pantry" in which plant foods are stored, to be gradually released to feed plants. The liquid portion of the soil consists of water and dissolved mineral and organic substances forming the soil solution. It is in solution that the nutrients are absorbed by plants. Hence, this portion is very important in plant nutrition. Besides solid and liquid, there is the gas or air portion of the soil which supplies plant roots and other living things with oxygen for respiration. Plant roots and soil bacteria, like men, need to breathe.

Chemically, all known elements are found in rock minerals. The same is true for soils. There are complicated chemical activities going on in the soil mass all the time, an example being the **base exchange** phenomenon of soil colloids.

Biologically, soil harbours plant roots, burrowing animals, insect larvae, earthworms, nematodes, protozoa, algae, fungi, and bacteria. All living things supported by the soil return to it in the end, to be broken down by micro-organisms into humus, a very complex organic substance whose exact composition is extremely difficult to determine. Humus is a storehouse of plant nutrients that are gradually released when it is further decomposed into simple mineral salts, carbon dioxide, and water. Humus is also

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important in creating and maintaining good soil structures (tilth) by increasing the water stability of soil aggregates and thus essential in checking soil erosion.

We may conceive soil as a living thing which is born of parent rock and slowly develops under the influence of climate, vegetation, topography, and time. There are many kinds of rocks—each differs from the other in chemical composition. During the early stage in the development of a soil, the parent rock is a deciding factor in determining the soil type. As time goes on, the influence of parent rock on soil is profoundly modified by other forces, especially climate and vegetation.

The process of soil genesis may be briefly summarised as follows:—At the beginning is the parent rock. Physical forces of weathering—the uneven expansion and contraction caused by heat and cold, and the wedging of ice and of plant roots—slowly split rock into fragments. Through grinding by running water, glaciers, land-slides, and scouring by winds, these fragments further break down into smaller particles. Chemical weathering also takes place and more soluble compounds like sodium, potassium, calcium, and magnesium are dissolved. Biologically decaying vegetation mixes humus with rock particles and plant roots gather minerals in the soil water from deeper soil horizons and add them to the surface layer. Micro-organisms are active either continuously or in seasonal cycles. Climate, especially temperature and rainfall, affect these soil-forming processes profoundly. Topography —which controls drainage, run-off, percolation, and erosion—is likewise important. Furthermore, the time factor is also significant in the development of soil.

2.—SOIL EROSION.

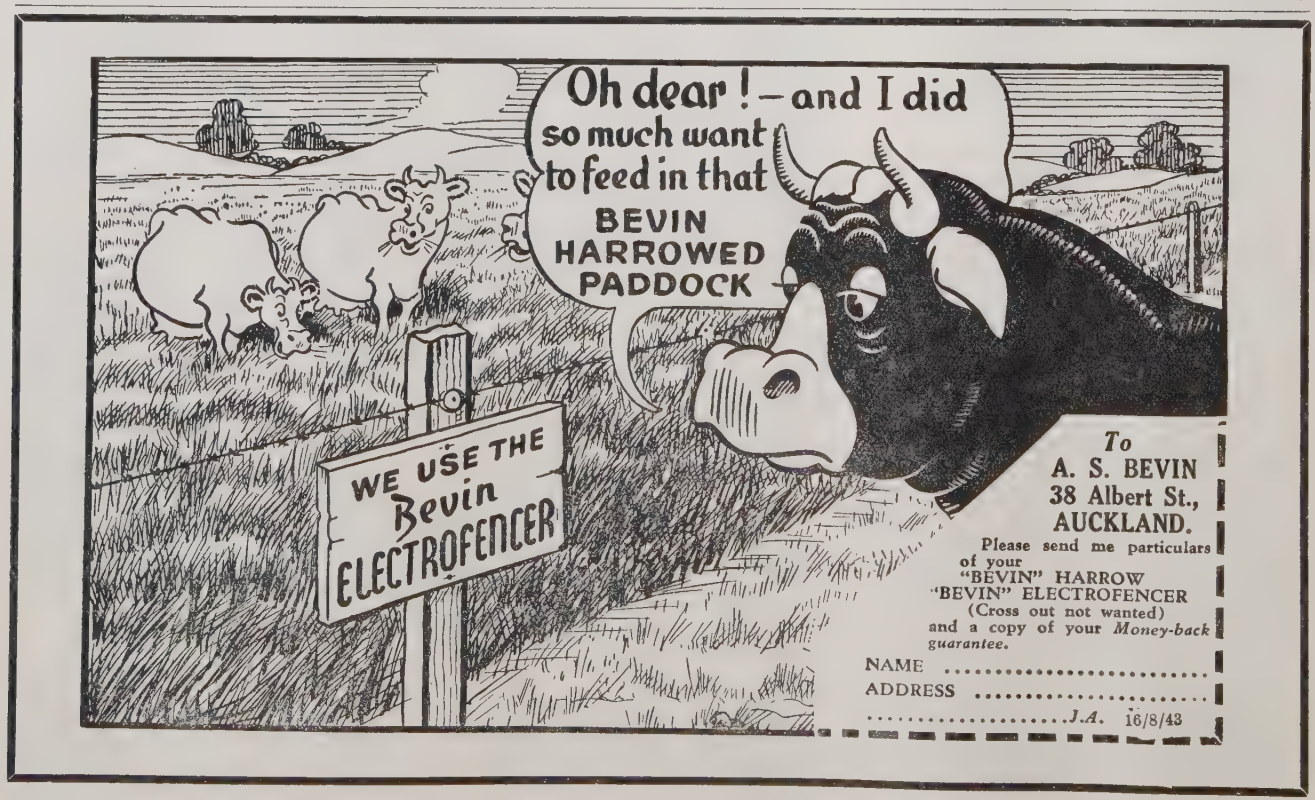
"Erosion is a natural process which has been sculpturing the face of the earth since the first winds began to blow and the first rain to fall. As a geological process erosion is a result of the impact of climatic forces such as rainfall, frost, and wind upon the land under varying conditions of slope and cover of natural vegetation. In those areas where climate and soil will support a mantle of vegetation under natural conditions, the geologic norm of erosion, or the normal rate of erosion, has been no faster than soil formation. With the leisure of geologic action, soil-forming processes have made weathered rock material into topsoils and subsoils and have produced the soil resource of agriculture. But when the land is cleared of its natural cover of vegetation to prepare it for cultivation, and when soils are bared by over-grazing or by fire, exposure to the direct attack of wind and rain, from which the soil had been protected for thousands of years, induces erosion of an entirely different order. This process is designated **"accelerated erosion** or **man-induced erosion or soil erosion"** (1).

Erosion as a natural phenomenon is a part of the soil forming process and is therefore constructive. It abrades in one place and builds in another. **Soil erosion** or **man-induced erosion,** on the other hand, is unnatural, destructive, and undesirable. It leads to soil and land destruction and disintegration of rural communities. If nature is allowed her own way, destroyed land will eventually be reclothed with vegetation and regenerate soil, but such a process is too slow to be of practical value to man.

Of the several agencies of erosion, water and wind are probably the most important. Both remove and transport surface soil, removal being increased with increase in velocity.

Water erosion is the transposition of soil by rainwater, running over exposed land surfaces and is classified into **sheet erosion, rill erosion,** and **gully erosion. Sheet erosion** is the more or less even removal of soil in thin layers over an entire segment of sloping land. In **rill erosion** run-off water generally tends to concentrate in streamlets leaving well-defined incisions with criss-cross patterns on the land surface. **Gully erosion** is that type in which deep incisions are cut by running water. Water erosion is very widespread in New Zealand as the greater part of the Dominion receives more than 40 inches of rainfall per annum (2).

Wind erosion is of no less economic importance than soil washing (3). Unlike the former, it is not governed by the factor of slope. It occurs in any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place where winds blow, but is mostly a serious problem in areas of low rainfall. Under conditions of natural ground cover, wind erosion, like water erosion, proceeds with the slowness of a geologic norm. When the natural ground cover is removed by ploughing the original stability of the soil is greatly reduced and the spongy organic matter becomes less cohesive. During dry periods, this organic matter becomes loose and powdery, and is easily swept up by the wind and transported over long distances. The lighter and more fertile soil particles are carried hundreds, and, at times, thousands of miles, and the coarser, heavier, and less fertile particles a much shorter distance. Wind excavation was reported of widespread occurrence in the Kaimanawa mountains in New Zealand by Zotov(4).

Comparatively little has been published on wind erosion, while a considerable amount of work has already been done on water erosion. In subsequent paragraphs, unless otherwise indicated, references cover water erosion.

3.—ESTIMATED RATE OF SOIL FORMATION CONTRASTED WITH RATES OF NORMAL EROSION AND SOIL EROSION.

There is very little information available on this subject. Bennett(5) remarked that there is evidence indicating that under natural conditions soil builds back from raw materials of the substrata very slowly, requiring no less than 300 to 1000 years or more in some regions to replace one inch of true top soil. Since surface soil is characterised by the presence of organic matter which always contains carbon and nitrogen, Merkle(6) estimated the rate of soil formation by the rate of organic matter accumulation under the humid temperate forest conditions of North-eastern United States. He found that it required from 50 to 80 years for the formation of one inch of surface soil.

The normal rate of erosion from Cecil sandy clay loam (S. Piedmont, U.S.A.) under forest conditions is probably somewhere near four and a half pounds of soil loss per acre annually. At this rate some 575,000 years would elapse before 7 inches of topsoil were eroded(5). On the other hand, 46 years only would be required to lose the 7-inch layer of surface soil from the same kind of land under the accelerated rate of erosion conforming with the annual production of a clean-tilled crop (cotton). Furthermore, where the land is completely bare of vegetation from year to year, only about 18 years would be required to take off the full depth of topsoil.

4.—IMPORTANT FACTORS AFFECTING SOIL EROSION.

Several factors operating together affect soil erosion. These may be outlined under three main headings, namely:—

The climatic conditions of any locality profoundly affect the erodibility of the soil through temperature and rainfall. A humid climate with low rainfall intensity well distributed throughout the year causes the least erosion. On the other hand, high rainfall intensity at 3 or 4 inches per hour even for a duration of ten minutes may result in an enormous soil-loss and flood.

The rock material from which the soil is derived affects the physical and chemical properties of that soil, including its erodibility. Both the percentage of slope and the length of the slope are important variants in erosion. Erosion from a 3 per cent. slope of 12 feet length will be very different from one of 120 feet length under otherwise similar field conditions. Soil

1. **Climate:** Especially:—
   - (a) Temperature and
   - (b) Precipitation:—
     - (a) Amount,
     - (b) Distribution and
     - (c) Intensity.
2. **Soil:**
   - (a) Parent material,
   - (b) Physical characteristics,
   - (c) Topography—slope:—
     - (a) Percent of slope,
     - (b) Length of the sloping area.
   - (d) Stage in the development of the soil (age).
3. **Surface coverage** (vegetation):—
   - (a) Kind and quality of coverage.
   - (b) Management and maintenance of coverage.

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porosity, a function of texture (size-proportion of soil particles), structure (arrangement of soil particles), and visible channels and opening in the soil, is the most important single factor governing water intake (the reverse of water run-off). Soil structure most important to the wellbeing of a soil is a function of (1) the amount of organic matter and its effect on aggregation, (2) swelling of soil celloids, (3) soil surface conditions, especially those modifying impact by rain, (4) effect of cultivation, and (5) the degree of biological activities.

Among the three groups of factors affecting erosion listed above, **surface coverage** is the most important from the standpoint of control of erosion. It is the one group which man can easily modify and forms the basis of most of the soil conservation work. The following figures from Miller(7) and his associates in Missouri and other United States Department of Agriculture workers in other stations will illustrate the intimate relationship of the types of surface coverage (vegetation—natural or artificial) to soil erosion.

Types of cover.	Years required to remove 6ins. of surface soil.
Forest	40,000
Continuous sod	2,608
Rotation of crops with sod	316
Wheat	85
Corn	43—20
Fallow	20

When studying erosion variants, it should be realised that all the factors operate together at the same time and are intimately related. Soil erosion, then, is the result of action and interaction of these factors upon the soil in a given period of time. Successful control on a nation-wide scale requires an adequate understanding of soil erosion and the factors governing it.

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Should Pullets Be Used As Breeding Stock

Mr. F. C. Bobby, Superintendent of Poultry Husbandry, discusses this controversial subject, and supports his contentions with evidence supplied from experiments carried out by him while in charge of British Poultry Development. a privately-owned experimental farm in Surrey, England.

THE advisability of using pullets for breeding purposes on commercial poultry-farms is a subject over which much controversy has occurred for many years. The practice of breeding from pullets has been on the increase in recent years. Many competent authorities, with opportunities for watching flocks built up by this method of breeding, have definitely stated that, in their opinions, the results obtained are not so satisfactory as where only hens are found in the breeding pens. It is a fact that satisfactory birds can be raised from pullet matings, but **only** if the **greatest** care is taken in the selection of these pullet dams.

It is not the purpose of this article, however, to discuss the subject over the full range of factors involved. One of the most unsatisfactory aspects of this controversy rests in the fact that, in the majority of cases, arguments put forward either in favour of or against breeding from pullets are based on purely individual opinions and unsupported by any concrete data. If pullet breeding is unsatisfactory as a general breeding policy, in what way will the poultry-keeper employing this method of mating suffer? Again, many poultry-keepers claim that if a second-year male or cock bird be used, then the possible immaturity of the pullets is offset and breeding from pullets becomes a sound practice. Is this just an opinion based on the experience of a few poultrymen or can it be supported by data collected under controlled experimental conditions?

Details of Experiment

This article details an experiment expressly designed to collect evidence upon the questions raised above. This experiment, however, deals only with two aspects of the subject, namely, the effect of breeding from pullets upon incubation and the subsequent chick-rearing. Since the season of incubation and rearing is now in full swing, it is an opportune time for studying these aspects of the subject.

The experiment under consideration was carried out in 1936, using Rhode Island Red and Light Sussex birds. All breeding stock was maintained under semi-intensive conditions, with good grass runs, while the progeny were reared in specially-constructed intensive housing. It will be noted that the number of birds employed was substantial, which fact increases appreciably the reliability or significance of the results obtained. The experiment was planned to test the following points:—

(a) A comparison between breeding from hens and pullets.

(b) A comparison between breeding from pullets mated to cockerels and pullets mated to cock birds (or second-season males).

The data collected from this experiment was noted under the following headings:—

1. **Hatchability of eggs.**
2. **Weight of chicks at a day old.**
3. **Mortality during rearing, up to 15 weeks of age.**
4. **Growth as indicated by the average weights of the birds reared to 15 weeks of age.**

Although referred to as one experiment, there was a number of factors other than those stated above being tested at the same time, but only the main factors relevant to the present

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discussion on breeding from pullets will be recorded here.

(a) **Comparison between breeding from hens and pullets:** The experiment to be discussed included also a check upon the effect of egg size in hens in regard to hatchability, rearing mortality, and growth. Although this aspect of the experiment has no direct bearing upon the main issue, it is included, since it is a matter of some interest to poultry-keepers. Thus, three groups appear in the experiment, namely:—

Group 1.—Eggs weighing not less than 2¼ ounces or over, taken from breeding hens mated to cockerels or first-season males.

Group 2.—Eggs of 2 ounces and over, but less than 2¼ ounces, taken from breeding hens mated to cockerels.

Group 3.—Eggs of 2 ounces and over, taken from pullets mated to cockerels.

Hatchability.—The figures in table 1 show a small advantage in favour of eggs from pullets, and these results are in line with general practical experience in England and results obtained in other experiments. The fall in hatchability with eggs of 2¼ ounces or over is an interesting feature and again confirms data previously collected.

2.—WEIGHT OF CHICKS AT A DAY OLD.

	Weight per 100 chicks.
Group 1 (hens)	9 lb. 12 ozs.
Group 2 (hens) ...	8 „ 11 „
Group 3 (pullets) .	8 „ 9 „

These figures indicate that heavier chicks may be expected from hen eggs, and when it is remembered that the pullet eggs hatched ranged from a minimum of 2 to over 2¼ ounces, the advantage in weight from hen-bred chicks is further emphasised.

3.—MORTALITY DURING REARING.

Table 2 which follows sets out the mortality experienced among the chicks hatched in the three groups under investigation. The results obtained are striking, and undoubtedly the most important piece of information furnished by the experiment. The difference in mortality between groups 1 and 2 is not significant, while that between the results obtained with hen-bred chicks as against pullet-bred chicks is obviously significant.

TABLE 1.—HATCHABILITY.

	Number of eggs set.	Percentage infertility.	Percentage hatch of all eggs set.
Group—1 (hens)	1,431	11.4	64.1
Group—2 (hens)	908	11.8	71.5
Group—3 (pullets)	5,058	10.9	74.5

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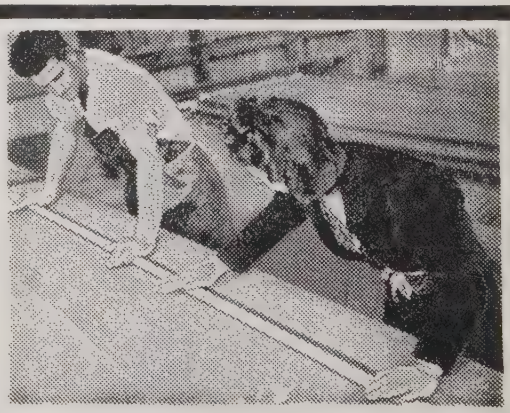

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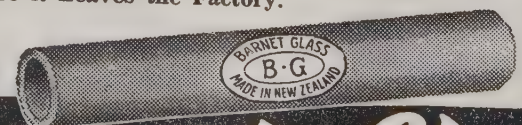

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TABLE 2.—MORTALITY DURING REARING.

	No. of Birds.	Percentage Mortality. Weeks. 0—4	5—8	9—12	12—15	Total.
Group 1 (hens)	774	3.8	2.3	0.7	0.6	7.4
Group 2 (hens)	555	4.7	2.2	1.1	0.4	8.4
Group 3 (pullets)	3,683	10.0	3.1	0.8	0.9	14.8

There can be little doubt, in view of these results, that additional chick mortality is likely to occur if pullets and not hens are used for breeding purposes. Since no culling was done during this experiment, the figures given represent the full mortality experienced.

4.—GROWTH.

At 15 weeks of age a representative sample of each group was weighed, and the data in table 3 obtained. The weights are expressed in ounces per bird. Here again it will be observed that cockerels and pullets bred from hens show an advantage in weight at 15 weeks of age over those bred from pullets mated to cockerels.

TABLE 3.—AVERAGE WEIGHT PER BIRD IN OUNCES.

	Cockerels. No. of birds weighed.	Cockerels. Average weight.	Pullets. No. of birds weighed.	Pullets. Average weight.
Group 1 (hens)	365	65.4	271	50.8
Group 2 (hens)	275	62.3	181	49.3
Group 3 (pullets)	858	60.3	777	44.8

To summarise the results so far described, it can be stated that the only advantage gained by breeding from pullets shows itself in the hatchability of the eggs produced in this group. For the remainder of the data, the advisability of breeding from hens is stressed by the better day-old chicks, lower chick mortality, and greater weights of birds obtained.

It now remains to be seen whether an improvement is effected by mating the pullets to cock birds (second-season males) instead of to cockerels, as were used for group 3, the results from which have already been given. For the purpose of comparison, the results to be described will be given under three groups.

Group 1.—Results of breeding from hens—eggs of 2 ounces but under 2¼ ounces (group 2 in the results previously set out).

Group 2.—Results of breeding from pullets mated to cockerels (group 3 in the results previously set out).

Group 3.—Results of breeding from pullets mated to cock birds.

HATCHABILITY.

	Eggs set.	Infertility.	Hatch of all eggs set.
Group 1 ..	908	11.8	71.5
Group 2 ..	5,058	10.9	74.5
Group 3 ..	1,215	14.7	69.2

The reduced hatchability of eggs from pullets mated to cock birds (group 3) is a result which would be anticipated by the experienced poultryman. Practical experience has indicated that greater infertility may be expected when second-season males are used, but the drop in hatchability is not sufficient to render the use of cock birds uneconomical.

MORTALITY

In table 4, while group 3, representing the progeny of pullets mated to cock birds, shows a small decrease in mortality as compared with group 2, it is obvious that the use of second-season males does not offset the possible breeding immaturity and consequent lack of constitution of pullets so mated. The marked advantage in favour of hen-bred chickens is still apparent.

GROWTH.

Average Weight, in ounces, Per Bird at 15 weeks.

	Cockerels.	Pullets.
Group 1 (hens to cockerels)	62.3	49.3
Group 2 (pullets to cockerels) ..	60.3	44.8
Group 3 (pullets to cock birds) ..	63.8	49.2

Taking the factor of growth as represented by weight, it is of particular interest to note the results obtained and set out in the above table. For this experiment at least, and it should be remembered that large groups of birds were reared and weighed, the use of cock birds in pullet matings appreciably influenced the growth of the progeny reared. The above figures indicate that the progeny from pullets mated to cock birds developed as satisfactorily as the birds reared from the hen matings.

Conclusions

The balance of evidence produced by this experiment is markedly in favour of the policy of breeding from hens. If, however, pullets are selected for this purpose, the experiment further demonstrates the fact that cock

TABLE 4.—MORTALITY DURING REARING.

	No. of Birds.	Percentages. Weeks. 0—4	5—8	9—12	12—15	Total.
Group 1	555	4.7	2.2	1.1	0.4	8.4
Group 2	3,683	10.0	3.1	0.8	0.9	14.8
Group 3	849	8.0	2.1	0.9	1.0	12.0

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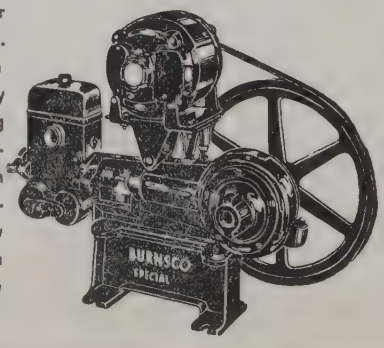

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birds (second-season males) should be used. It is evident that any poultry-keeper who elects to mate pullets to cockerels is liable to sustain not only increased losses by chick mortality but also an ultimate loss from birds which have not developed entirely satisfactorily as compared with hen-bred birds. All experiments conducted by the writer with the object of testing pullets as breeding stock have indicated one logical conclusion. It is impossible for even experienced poultrymen to select pullets for breeding purposes without some errors of judgment. When hens are selected for the same purpose, a heavy pullet year of production has automatically weeded out those birds with insufficient constitution or, alternatively, reduced such birds to an unsatisfactory physical condition, which to the experienced poultryman is obvious, and an adequate warning in respect of their suitability for breeding purposes. On the other hand, pullets when required for selection for breeding purposes are in their flush of condition, having been subjected to only limited strain by egg production. Thus, it is particularly difficult to observe any weaknesses at this stage regarding constitution or stamina. Furthermore, it can also be claimed that with any pullets, other than early-hatched birds, it is practically impossible by inspection and handling to determine whether these birds are fully mature.

For the reasons given and in view of the results obtained from carefully conducted experiments, poultry-keepers are strongly advised not to resort to breeding from pullets. If circumstances force the issue and breeding from pullets must be considered, then poultry-keepers should select breeders with the utmost care, having regard to maturity and constitution. Only early-hatched pullets should be used for this purpose, and they should be mated to cock birds of proven "stock-getting" ability and constitution.

Ploughs and Ploughing.

PLOUGHS have been designed to work under a wide variety of soil and topographical conditions as well as to produce differing mechanical effects in their passage through the soil. The result has been to produce a very wide range of types, each particularly adapted for a certain kind of work, or for special conditions of soil, or for the power available for traction.

Apart, however, from differences in design, certain basic features are common to most ploughs, and the general principles of operation are the same.

This subject is fully discussed in bulletin No. 185, which is obtainable *free* from the Department of Agriculture, at Auckland, Wellington, Christchurch, Dunedin or Invercargill.

Thousand-Headed Kale As a Fodder Crop

In the past kale has been used to a varying extent throughout New Zealand, but with the exception of a few individual cases, no great reliance has been placed on it. It has, however, become a proved crop to some growers, who find it their most reliable forage proposition. Generally the accepted place of kale in yield and feed value is between that of rape and the turnip or swede crop. Where these have been successfully grown kale has displaced neither, but where they have not performed well kale is proving capable of taking their place to a greater or lesser extent.

— By —

W. R. LOBB,
Assistant Instructor in Agriculture, Dunedin.

THE kales as a group lend themselves to much variation so that it is not surprising to find different varieties grown for different purposes. The chief types as we know them are thousand-headed, buda, rape kales, and marrow-stemmed kale. The latter is more commonly known as chou moellier. Possibly also much of the Maori cabbage sold fits into one or other of the kale groups. With the exception of two of these, thousand-headed and marrow-stemmed, the others can be dismissed as being of less importance because of the amount of uncertainty associated with their performance and type.

At one time buda kale was quite popular and seemed to be a uniform type fitting in between true rape and true kale, but more recently it has consisted of a mixture of intermediate types, and, because of this, has lost any popularity it once had. Of the rape kales there are two distinct types, an early giant form with smooth leaves and a late form with very curly leaves. These do not perform as well as true kale, and are incidental to this article. At present it is not necessary to discuss marrow-stemmed kale (chou moellier) as its place in our farming is well known.

Soils

Thousand-headed kale is suitable for growing on a wide variety of soils, but like other crops of the cabbage family, prefers land in fairly good heart. However, if a "light" soil is well cultivated and well treated good crops can be grown. Excellent crops can be grown on some of the stronger land which has a stiff sub-soil provided it does not show a tendency to become waterlogged. The colder medium clay loams which form a large proportion of our farming ridge country are admirably suited for growing kale.

Climate

Kale can be grown over the complete range of climatic conditions experienced in the arable farming areas of New Zealand. It shows favourable qualities in some adverse climates as compared with other forage crops such as rape and turnips. Kale properly utilised has a long-growing period, and has the attribute of being able to withstand periods of drought and severe frosts to a greater extent than other forage crops.

Utilisation

In the past thousand-headed kale has been used as a supplementary winter feed crop, but for this purpose it has most frequently been used on the stronger land in moist districts such as the Taieri Plain. It has been either fed standing to cattle or sheep, or sometimes been cut and fed off to sheep. Thus, it has been used in a similar manner to chou moellier, although chou moellier, under the ideal feeding system, is more frequently cut and fed out to cattle. The reasons for cutting chou moellier are:—

1. The loss due to tramping and damage is greatly decreased.

2. It is considered a much more palatable feed when cut 12 hours before feeding.

Of late years, however, thousand-headed kale has been grown over a much greater range of soil and climatic conditions. On the lighter ridge country of Waikouaiti-Oamaru, from Palmerston to Dunback, in many areas in Central and South Otago, and in the sheep districts of Southland it is increasing in popularity, not as a winter feed, but as an autumn and spring feed crop. However, in the rich soil districts of Otago and Southland where the best of New Zealand's root crops can be grown for winter feed, it is very unlikely that kale will ever be popularised as a winter feed crop.

It is not suggested that kale is as good a fattening feed as rape, but why persist in trying to grow rape

A fine crop of thousand-headed kale.

where the climate is not suitable, and where a crop can be assured only in one out of four or five seasons? In the Strath-Taieri and similar districts, for instance, fair crops of giant rape can be grown which act as good fattening crops in some years. Broadleaf types seldom produce sufficient bulk. In wet seasons the giant type will not fatten well. Where the weather conditions between growth and ripening are usually moist the giant type of rape is not a good fattening feed. Under conditions where the giant type of rape will fatten so also will kale, and further, kale has the attribute of producing a reasonable crop under more uncertain weather conditions.

Instances in Otago where excellent results have been obtained with kale are numerous. On five acres of kale in the North Otago district 960 lambs were fattened between March and May. This crop was fully five feet in height and the farmer experienced the utmost difficulty in mustering the lambs off the areas, as even on horseback and with good dogs it was a difficult task to locate all the lambs. The crop was then closed up for seed and produced over 7cwt. of seed to the acre. It was then fed the following March and April with another 520 lambs.

On another property in the Dunback district lambs were fattened on kale, this property never having been able to fatten lambs prior to the introduction of this crop. On yet another property in Central Otago lambs were fattened on kale where rape would not produce sufficient bulk to feed the hares and rabbits on the area. On the Taieri, in South Otago, and elsewhere, kale has been used in many similar instances to these with equally good results.

To sum up the present practice in utilising kale, it is pointed out that, on all but the strongest land, kale will act well as a feed crop during the autumn either as a fattening crop or as a maintenance crop for flock sheep, and is generally used in this manner.

On the stronger land it is frequently used during the winter as a maintenance crop. Its use can be extended considerably to embrace the early spring feeding period. For this latter purpose it would be best to leave an area ungrazed during the autumn and winter so that it could be used very early in the spring, before any flush of grass appears. Generally the practice is to use the second growth on the autumn-grazed area for spring feed.

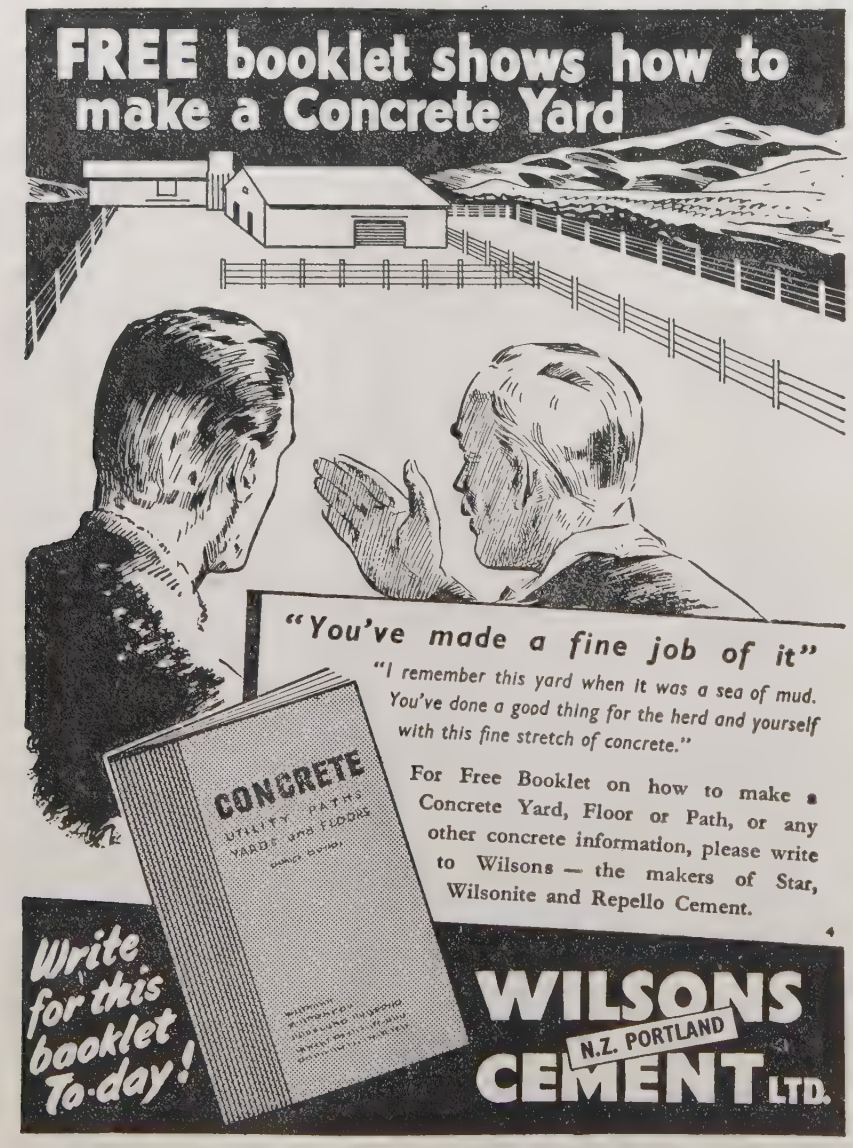
Two instances are known where crops of kale have been utilised for periods of three seasons in Otago. However, to produce the greatest bulk of feed kale should be allowed a long-growing period. It should be sown early in spring and allowed ten to twelve months to reach full maturity. It is at this stage that the sprouts that give the plant its name break forth. To obtain this large bulk it should not be fed before or during the winter but allowed to stand right through in the full leaf stage. In this connection too, it is advisable to mention that chou moellier will not perform satisfactorily if used in this way, because in the ripening stage in the spring it has a decided toxic effect if fed to animals and tends to produce red water.

It can be seen, therefore, that even without counting on winter grazing kale will fill in two important gaps in the general feed supply, autumn and early spring. It is the only crop with the exception of rape, grown as a fodder crop, that can be fed at all seasons of the year, but rape loses much more of its foliage in the winter than does kale.

Although kale has not been extensively used as a lamb-fattening feed in the past its use for such cannot be lightly dismissed. It is a very acceptable crop for all grazing animals and is readily eaten by lambs. Its greatest possibilities as a fattening feed are to be had on some of the drier areas where other fattening crops are almost complete failures. Under such conditions it could readily displace rape for topping off milk lambs. The highest per acre returns would, however, come off better-class land.

Cultivation

The place of kale in any rotation presents a difficulty that has in no small measure prevented its more popular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use. In this respect it should be mentioned that kale does not show to its best advantage on newly-cultivated lea land. Therefore, in order to achieve early sowing it should follow a fallow or partial fallow. Most farmers have in the past experienced some difficulty in finding a crop to follow turnips. The growing of two successive crops of turnips has always been courting risk in view of the danger of club root attack. Kale being resistant to club root is a good crop in this respect to follow turnips when two cruciferous forage crops are required in succession. To get the best results from kale it must necessarily occupy a lengthy period in the ground. Kale should be sown in November and is available for feeding in February-March, and again in early October-November.

Kale can be sown on the flat or on ridges. On heavy land it can be sown on ridges, and cultivated in much the same way as a swede crop. On the flat it can be sown in 7in. or 14in. drills depending on the quality of the ground. It is better to sow through every second coulter on strong, moist lands. On light lands subject to dry spells, or under low rainfall conditions, it should be sown in 7in. drills. It can be used for a cover crop for sowing out pastures or clover stands, but should not be so used where it is likely to produce heavy crops, as, due to the great amount of feeding it will stand, the resultant pasture would be too severely treated in its initial stages. Where used as a cover it should be sown later, and grazed, not to get the best from the kale, but to do the best for the pasture.

Rates of Seeding

Depending on the method of sowing, the quality of the land, and the climatic conditions, the following should be suitable:—

On ridges	**1 —1½ lb.**
„ flat in 14in. drills on heavy land	**1½—2 lb.**
„ „ „ 7in. „ medium land	**2 —2½ lb.**
„ „ „ 7in. „ light dry land	**4 —4½ lb.**

When sown in 7in. and 14in. drills, or broadcast, with a grass seed mixture a lighter seeding should be sown.

Pests

Kale shows more resistance to root and leaf pests than do rape, turnips, or swedes, but is not generally as resistant as chou moellier. Club root does not severely attack the plant. White butterfly and diamond-back moth both attack it but not too readily. Aphis or blight attacks it to some degree in its early flowering stages.

Palatability

Of the different types of kale discussed tests have shown the palatability varies. Some are more palatable in the early stages and some later. The early palatable types are—buda kale and early rape kale, then comes late rape kale. Thousand-headed appears to be most palatable at a later stage, but is then readily consumed by all stock.

Rates of Recovery After Grazing.—In this respect thousand-headed kale heads the list of all fodder crops. The rape kales and buda kale do not give the same recovery, another reason for their lost popularity.

It can thus be seen that thousand-headed kale is a very valuable addition to the list of fodder crops and indeed is one deserving of more recognition. Its long period of growth, together with its ability to stand adverse conditions, and its prowess in recovery after grazing make it an attractive crop for supplementary late and early sheep feed.

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Veterinary Notes for the Farmer

Docking and Marking of Lambs

DOCKING is usually carried out when lambs are about three weeks old. If done at a younger age mis-mothering may occur, unless only small numbers are dealt with at a time. Where a castrating instrument for crushing the cord is used there may be difficulty in locating the cords at the earlier age.

A suitable day should be chosen, and if possible avoid operating when the ground is wet and muddy, as the lambs' legs and feet may be dirty, and there is greater likelihood of wound infection. Similarly, very dry, dusty conditions should be avoided.

Clean Paddocks Essential

The importance of using a temporary wire-netting yard in a suitable clean part of each paddock cannot be too frequently stressed. In addition, it is important that the paddocks in which the lambs are put after docking are clean and reasonably free from bare patches under hedges and trees, and around stack bottoms, where the lambs may lie down and thus infect the wounds.

Experienced shepherds do not need to be reminded that ewes and lambs should be brought into the yard as quietly as possible and after operating the lambs given due time to find their mothers again. Docking is best done with a suitable sharp knife. The use of a hot iron, which was supposed to prevent bleeding and avoid a check, and a castrating pincers to remove the tail, is not recommended, as both these methods leave a certain amount of dead tissue which serves as a breeding ground for germs.

For castration of the male lambs, many still use a knife to remove the end of the purse, and the testicle is drawn away causing rupture of the cord which prevents bleeding. Castration pincers for crushing the cord are becoming increasingly popular. They have two great advantages: (1) no open wound is caused, so that there is one less wound where possible infection may enter; and (2) the operation is much less painful, and the lamb is less likely to lie about and thus infect the tail wound.

The use of pincers has been found to considerably reduce the number of cases of arthritis and other infections following operation. It is important that care be taken to make sure that the cord is properly held to the outside edge of the upper part of the purse, and gripped between the pincer jaws. It is advisable to change hands for each side.

Infection Causes Deaths

Deaths within a few hours of docking may occur, but are by no means common. These are usually big fat lambs, and it has been suggested that this is due to acute entero-toxaemia (pulpy kidney) already present at the time of docking. It is more likely that it is the result of some form of infection.

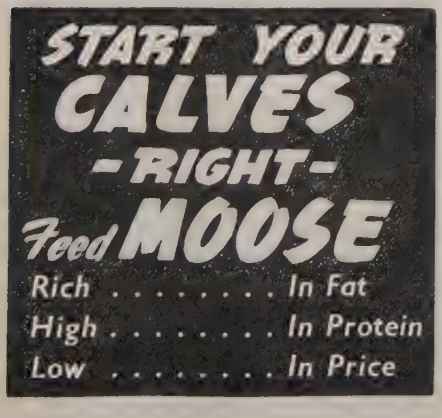
1. Malignant Oedema: (Blood-poisoning): This is the commonest type of infection. Deaths occur within two, or at most three hours of docking. The skin around the crutch and inside the thighs is blackened, and the tissues swollen, with blood-stained serum and gas.

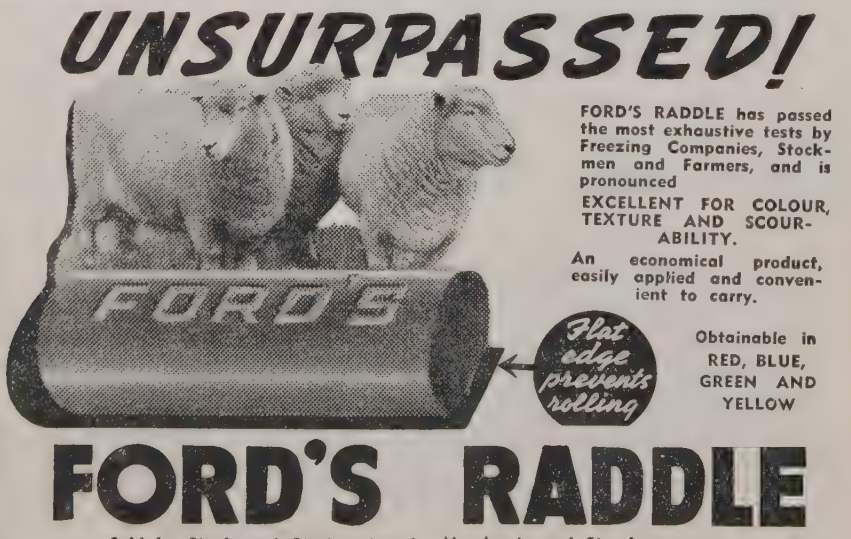
2. Blackleg: Some cases have been confirmed on lambs following docking (see the "Journal of Agriculture," November, 1941). The lesion resembles malignant oedema, but the muscular tissue when cut into is drier, and skin may have a "crackling" feel over affected part.

3. Tetanus: This is not common, and only isolated lambs are likely to be affected. Cases have been seen following use of hot iron for docking. The disease may appear in a variable number of days after docking. The lamb is stiff all over, limbs, head and neck. If down, the legs are stiffly extended.

4. Paralysis: Odd cases have been seen where paralysis of the hindquarters has resulted a week or two after docking, due to an abscess in the spinal canal, infection having extended up from the tail wound. Apart from the paralysis, the lamb, if hand-fed, will continue to grow and thrive, but such cases are hopeless.

5. Arthritis: This is one of the most serious after-effects. Though death is not common, lambs are very lame in one or more legs for a fortnight or more, symptoms appearing a few days after docking. There may be swelling of a joint in affected limb, often the hock or stifle. Many cases never recover completely, and later have to be rejected for export owing to big joints or wasted limb. Cases, of course, are

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seen in lambs prior to docking, indicating navel infection soon after birth. The reduction that can be brought about by pincer castration, however, indicates that the purse wound is an important portal for infection.

5. Lymphadenitis: The result of this infection is not likely to be noticed until the carcase is being inspected after slaughter, where swelling or perhaps abscess formation in lymph glands of the flank may be present. A high incidence amongst wether lambs in certain lines again implicates the castration wound as an important path of infection, though it is known that shearing wounds are probably more important.

—D. MARSHALL, M.R.C.V.S., District Superintendent, Wellington

Some Lambing Troubles

THE first work connected with lambing is the attention to, and the erection of holding pens. There should be easy access to at least one of these from every large paddock and they should be shut up for a period before lambing to allow the growth of fresh grass.

An adequate lambing kit consists of a canvas bag or knapsack, a small bottle of antiseptic, piece of raddle, pocket knife, a couple of pieces of window cord and the inevitable piece of string.

Bearing Trouble

For convenience, bearings can be placed in four classes. The fresh, developed, old, and after lambing.

The fresh stage, when it has been out just a short time, is easily attended to and should be almost one hundred per cent. successful. It is usually clean and only needs putting back and tying up. In tying up a bearing ewe several tightly pulled criss-cross strings, tied with a half-hitch to tufts of wool, is much preferable to other methods, such as stitching up the vagina, wooden pegs, safety-pins, etc. All bearings tend to recur the following season, which makes it necessary to nick the sheep's ear or mark it so that it can be easily culled or killed before next lambing.

The next stage of developed bearing is when the bladder has come out inside the inverted vagina and has become distended with urine which the ewe can't get rid of, and also the flesh tissues have become swollen. The first essential is to get the urine out of the bladder. If the ewe is held on its back the outlet will be on top. Press the whole bag with fingers extended so that you press the bag in next to the outlet—this will allow the urine to pass. Don't be in too much of a hurry. Keep pressure on the bag and although the ewe will strain against you, it will eventually go back. Losses from this stage will usually be due to infection, so be careful to avoid abrasions. After treating ewes in these first two classes, raddle them and keep under observation as they may need assistance in lambing (probably in a fortnight or ten days' time).

The third stage should seldom occur because it is the result of negligent attention to the ewes. This is when a bearing has been neglected or not found till it is old and dry, probably scabby and fly-blown. By this time the ewe is probably beyond saving but the lambs can be saved by immediate attention. Lie the ewe so that you can easily get at the left side of the belly. Very quickly cut the ewe's throat and break her neck, cut the belly open and take the lambs (there are usually two) out of their separate bags. Lambs will gasp as soon as the blood stream is cut off and speed is therefore very essential to prevent the lamb getting a lung full of mucous when it does gasp.

The fourth stage is when the bearing comes out after lambing. Usually it does not pay to go to much trouble with these. Clip away the wool to minimise blow-fly risk and the ewe will probably survive to rear the lamb after which she can be killed for the dogs.

Normal Delivery

It is not advisable to lamb a ewe if she can do the job for herself; and it is not always possible to come back later to see if she has lambed. It is usually easy to tell for what length of

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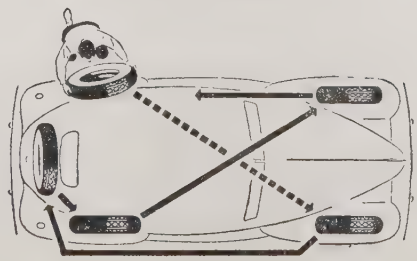

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time a ewe has been trying to lamb by the state of the water-bag. If it is a fresh colour and/or the bag still unbroken, she has probably just started to lamb. If the water-bag is broken and discoloured, or if there is no water-bag showing and the ewe is straining hard or is distressed it is necessary to lamb her. With a normal delivery this is quite simple and needs no explanation except to stress the necessity of avoiding any scratches or abrasions to the ewe. After the lamb is delivered clean its mouth and place it near the ewe so that she will immediately proceed to dry it. If the ewe shows any tendancy to run away from the lamb, tie her up with a piece of window cord or rope until the next day.

Abnormal Delivery

These are many and varied. In some cases, such as a lamb coming with one front leg and one hind one, or head and no legs, or head and one leg, the treatment is straightforward and common sense. As is well known the greatest mortality during delivery occurs with breech-births (i.e., lambs presenting hind legs or tail first). Evidence of this can be seen with lambs that are dropped dead having the water-bag broken at the tail and intact over the head.

Many farmers can recollect struggling to turn a lamb round, sometimes successfully and sometimes not, only to find that it is dead when they get it delivered. And yet it was alive when they started. Over the past two seasons I have not lost one breech birth, the remedy being, **don't** try to turn the lamb round. After getting the hindquarters past the pelvis, hold the lamb's legs in your left hand and pull gently until you are able, with the right hand, to squeeze the lamb's ribs firmly enough to keep it's lungs deflated. Pull the rest of the lamb clear, keeping the lungs compressed until the head is clear. Release the lungs, at the same time clearing mucous or tissue away from the lamb's nose or mouth. The explanation for this is that, due to either the naval cord becoming strangled against the pelvis bones, or to the shock of the cold air, or both, the lamb gasps for breath. If not prevented from doing so when its head is still inside the passage it will inhale mucous into its lungs.

In delivering dead lambs, first rub a few drops of strong antiseptic on your hands and arms and you will find that the odour is not so persistent.

In the case of prolapse of the womb following delivery, my experience is that although some say it can't be replaced successfully, it is worth trying. I saved one once, and on another occasion I saved a ewe for long enough to rear the lamb by tying string tightly around the prolapse close up and cutting it off, using a strong disinfectant.

Feeding Lambs

The old method of feeding a lamb that is too weak to suck, with a spoon, is most unsastisfactory, usually ending in the milk going down the wrong way. Here is a simple and efficient way of doing it with a rubber tube. Attach the thick end of the tube to an ordinary lamb's teat with a very large hole in it, put the teat in a bottle of milk (two to three ounces with a teaspoon of glucose), hold the bottle upside down so that the tube gets filled with milk and pinch the tube so that it keeps full, then push the tube down the lamb's throat. It is easy to tell

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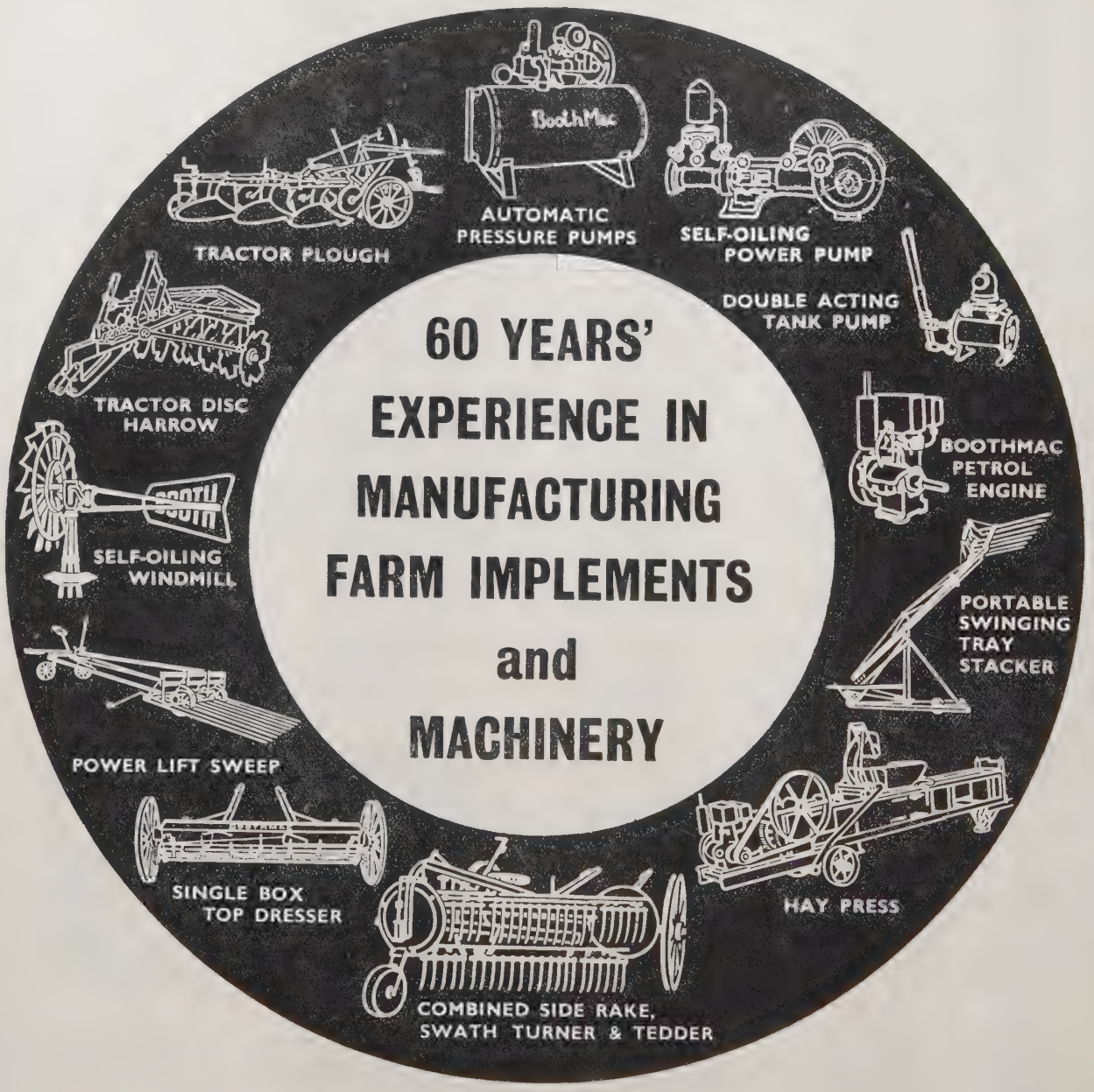

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if it has passed down the gullet. If right, the lamb, even if very weak, will swallow gently; if wrong it will cough, splutter and struggle. Having ascertained that it is correctly placed, release the tube so that the milk flows down the lamb's throat. If you attempt to pour or drop the milk directly into the tube, the lamb will probably get too much air into its stomach.

An old baby's teat is very handy for a lamb that is strong enough to suck gently.

—R. W. LOGAN,
Rawene

Answers to Correspondents

COWS FAILING TO HOLD CALF

"J.B." (MORRINSVILLE)—

I am having a lot of trouble with my dairy cows. They are all coming in from two weeks to a month before time. The calves are all born alive. Can you explain this?

First I had a two-year-old heifer come in before time so I drenched her and then she showed signs of blood poisoning. The symptoms were that her tail was all the time stretched out and she was continually steaming at the back and little drops of urine and dung used to come from her. We drenched her with Epsom salts, ginger and molasses for three days and she got better. She is giving 10lb. of milk in the mornings. When she was ill I put her in a paddock and she was there three days and then a flood came and covered the flat where I had the dry cows grazing. I took the heifer out of that paddock and then I put the cows there and after they had been in the paddock four days they all started to slip their calves. I put 1lb. of Epsom salts in the trough from which they were drinking. The trough holds 150 gallons of water. I am wondering whether the salts might have caused it. I was feeding them on hay, and because of this I put the salts in the water as I did not want them to get constipated. In the next paddock, which is served by the same trough, I have eight two-year-old springing heifers and they use the same trough and are quite alright. I would be pleased if you would advise me what to do to the cows before they go back to the bull. I have them on good grass now and they seem to be coming on to their milk.

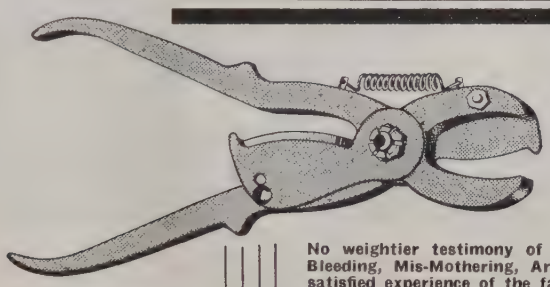
LIVESTOCK DIVISION—

If the heifer mentioned did not clean after slipping, the symptoms described by you are not unusual. In any case, there would be a degree of inflammation of the calf bed and collection of discharge predisposing to straining, etc.

With regard to the cows slipping: The Epsom salts was not responsible in any way, and presuming the hay fed was not ergotised or mouldy, which might play a part, the slipping was probably due to a late virulent infection and the organism likely responsible in your case was that of contagious abortion, known as *Brucella Abortus*.

You would be advised to take a blood sample (about ½ oz.) from the cows that slipped and forward to the Animal Research Station, Wallaceville, Wellington, for the agglutination test for contagious abortion. Bottles for this purpose may be had on application from the above-mentioned station and the blood required may be got by cutting the tip of the tail with a sharp knife.

Treatment of the slipped cows, such as vaginal douching or drenching before sending to the bull, is not likely to be of any use, nor is it advised. Should the cause of the slipping be *Brucella Abortus* these cows will probably for the most part calve normally



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MOWAT CASTRATOR and TAILER

STOPS LOSS OF LAMBS

TAILER ONLY
(as illustrated)

£3

COMBINED CASTRATOR AND TAILER

£4

No weightier testimony of the unfailing efficiency of the MOWAT in preventing loss of lambs by Bleeding, Mis-Mothering, Arthritis, and all After-Tailing Dangers could be given than the more-than-satisfied experience of the farmers themselves. Here are a few typical extracts from the many letters of high appreciation.

Hastings Club, Hawkes Bay, February, 1943.

Dear Sirs,—Being among the first users of the "MOWAT" Tailer in Hawkes Bay, we wish to put on record that this tool meets a long-felt want on the farm in connecion with docking, is almost fool-proof and is a hundred per cent. efficient. You can dock a paddock of lambs and in a relatively short time they are mothered up and away. (Signed) JOHN GRAHAM.
(For Netherby Ltd.)

Ocean Bay, Blenheim, 22nd March, 1941.

Dear Sirs,—Previously I nearly always lost one or two, up to half-a-dozen lambs (generally some of the best ones) out of 250, but last year did not lose any with the "MOWAT."
(Signed) W. J. CRUMP.

Dromore, Canterbury, 16th April, 1943.

Dear Sirs,—I tailed over 500 lambs with the "MOWAT" Instrument; did not lose a lamb; Arthritis was conspicuous by its absence, and I am pleased to number myself among the very satisfied owners and users of these instruments. (Signed) D. J. SCARTH.

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Farmers' Co-op. Org. Socty. N.Z. Ltd., all Branches, Taranaki.
N.Z. Farmers' Dist. Co. Ltd., Marton, Taihape and Hunterville.

next season, as a degree of immunity is to be expected.

Difficulty may be experienced in getting some of these cows in calf due to infection and catarrh of the calf bed, necessitating individual attention and treatment by a veterinarian.

A recurrence of the trouble on anything approaching similar dimensions next season should be early reported to your own veterinarian or the nearest Departmental veterinarian for further investigation.

Blindness in Sheep

"ANXIOUS," (NORTHLAND):—

A fortnight ago, when shifting my sheep, I noticed that 4 of them were blind. These I isolated. A week later, I found that another 6 were also blind—and now, a further number are in the same plight. These sheep have never been on long, seedy feed. Until now, I have not had any blind sheep for the past 15 years, nor have I bought any for many years. Can you suggest what is causing this blindness and is there any remedy?

LIVESTOCK DIVISION:—

The disease affecting your sheep is known as contagious ophthalmia, better known as "blindness" or "pink-eye." This complaint is quite well known to sheep men throughout the Dominion, and is more prevalent in adult sheep.

In this disease there is pronounced inflammation of the membranes lining the eyelid (conjunctivitis) and also the inflammation of the cornea (keratitis). The cornea is the transparent anterior portion of the eyeball.

A non-infectious inflammation of both these areas may occur from external injury or the introduction of some foreign body, such as dust, chaff or grass-seeds. It may also be caused in lambs by irritation resulting from turned-in eyelids (entropion).

The infectious type which sets up these two conditions of conjunctivitis and keratitis in sheep occurs in New Zealand and several other countries. It has never been sufficiently studied, but in all probability this again is a specific virus disease.

Generally, the first indication of the disease is that a number of sheep are blind, and on closer inspection it will be found that the front of the eye is no longer clear and transparent but has assumed a hazy blue appearance, later changing to a milky-white opacity. If, however, the symptoms are more closely studied the first thing noticed will be a flow of tears from one or both eyes. The affected animal is particularly sensitive to light, and the eyes are frequently closed or kept partially closed in order to avoid as much light as possible.

Advisory Service on Veterinary Matters.

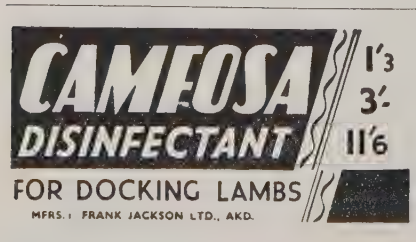
Farmers are invited to submit inquiries connected with the health of their stock, and the replies will be published under this heading.

The membranes of the eye will be seen to be congested and bright red in colour, and as the infection progresses the cornea becomes involved and is no longer transparent. The infiltration is often deep-seated, and the opacity spreads until it covers a large part of the cornea. The surface of the cornea may be quite smooth and intact, or it may be ulcerated.

Constitutional disturbance seems to be very slight or absent, but naturally there is some falling-off in the condition of affected sheep. Tears from infected sheep have been shown to transmit the disease to healthy sheep after a short incubation period. In naturally occurring cases there is a tendency to spontaneous recovery in approximately three weeks from the onset of symptoms. As the acute inflammatory stage subsides the eye gradually clears up, but occasionally in an odd animal there results permanent opacity of the cornea, causing blindness.

It has been established that a fairly lasting immunity develops after recovery from natural infection. No method of vaccination, however, has been evolved to afford any protection against the disease.

Treatment is not very practical because of the difficulties of repeated treatment of large numbers of sheep. If possible, an affected mob of sheep should remain isolated from the rest of the flock on the farm. They should be depastured in a paddock where there are no drains, creeks, or ditches,



Top—Before.
Middle—After.
Bottom—The job completed.

Procurable from all Stock Agents, or

the DUX Tailer

An Instrument All Practical SHEEP FARMERS Require.

It Saves Its Cost Several Times Over in the First Season. Price £3/5/-

ASK THE MAN WHO OWNS ONE.

Letter from R. G. KENNEDY, Stratford: March, 1942.

"I found the 'Dux' Tailer is efficient and fast, and did a good job of tailing with practically no loss of blood. The tail heals quickly with a nice rounded end. The lambs, after operation, recover quickly. There is a right way to use the machine, and instructions on how to use must be carefully studied."

From Mr. W. A. FAIRWEATHER, Mt. Harding Station, Methven: 10th April, 1941.

"Having used the 'Dux' Tailer last year on 300 lambs, I feel I am now in a position to express an opinion on this machine. I find it efficient and fast, and this year, compared with previous years, lost very few lambs through tailing operations. In comparison with another make of machine used at the same time, I found the 'Dux' Tailer did not allow of any bleeding, providing the operation is properly carried out—i.e., by holding the lamb steady until the handle is fully released. I find this method just as quick as the knife and a much cleaner job. Recovery of the lambs after the operation is much quicker than if a knife were used. I have no hesitation in recommending this machine."

Simple and efficient. Easy to use. The "Dux" reduces losses to a minimum, because there are no after-effects.

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P.O. Box 1137, Auckland. Telegraphic Address: "ACOL"

so that the minimum amount of damage is done through the temporary blindness.

Affected eyes may be treated by the installation of a few drops daily of a 10 per cent. solution of Argyrol, or a cheaper preparation consisting of 2 grains of sulphate of zinc, 10 grains of boric acid, and 1 ounce of distilled water.

The eyelids could be lightly smeared with a small amount of a 2 per cent. yellow oxide of mercury ointment.

Abcess in Sow's Udder

"S.J.E." (Eketahuna):—

I have a valuable sow which is due to farrow in seven weeks time. She has a lump or abscess in her udder near her hind legs. This lump or abscess appears to be in between two teats. It is hard, about the size of a tennis ball, and first appeared about four weeks ago. How should I treat it?

Livestock Division:—

It seems as if the sow has had an injury to the udder either from a knock or from a puncture from a sharp instrument such as a nail or sharp stone.

If she can be handled quietly you should foment the part with hot water two or three times a day, thoroughly drying the part afterwards with a soft, clean cloth.

When the abscess points, open it with a sharp, clean knife and drain out as much pus as possible. Syringe out with a weak solution of Condys crystals three times a day.

Keep the sow in a clean yard and feed on nutritious sloppy food whilst under treatment.

INSURANCE AGAINST WORMS

FROM 1/5 per 100 LAMBS

You always take the wise precaution of insuring your farm buildings and equipment. Isn't it sound commonsense to ensure the HEALTH of your sheep? These tried and tested drenches, constantly used by thousands of New Zealand farmers, provide low-cost protection against all of the more common worm infestations.

GIESEN'S (Carbon Tetrachloride) Sheep Drench gives protection against stomach, bloodsucking intestinal worms and Liver Fluke, and costs only

5/8 per 100 sheep

2/10 per 100 lambs

SUTTON'S (Nicotine Bluestone Cobalt) Drench gives protection against small intestinal hair worms, and tape worms, and costs only from—

1/5 per 100 young lambs

5/10 per 100 fully grown sheep.

Agents and stockists everywhere. If any difficulty experienced in obtaining supplies, communicate with

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PEAS have gone to WAR, and BEANS are going too--

Arthur Yates & Co. Ltd. have been entrusted to supply a major proportion of the seed requirements of the Allied Nations as well as the greatly increased needs for New Zealand Food Production. Peas and Beans are crops that are essential to the War Effort—(is it not far better to ship to the widely scattered war fronts dried Peas and Beans — they take only a fraction of the shipping space and need no special storage?) The New Zealand and Allied Governments are asking us for greater production. We're doing our part—can you help.. If you are in a Pea or Bean seed-harvesting district consider now, before it's too late. Can't you sow for a seed crop or increase that area you have already promised?

PEA SEED GROWERS WANTED MAINLY FOR Greenfeast and Blue's types.

BEAN SEED GROWERS WANTED for all types of Beans—Dwarfs, Runners, Broads.

Grow with security with New Zealand's leading seed growers.

Get in touch now with your district agent.

Poverty Bay: Common Shelton, Gisborne; Williams and Kettle, Gisborne.

Hawkes Bay: G. D. Wilson, Wilson's Nursery, Hastings; Arthur Simmonds and Co., Hastings and Napier.

Marlborough: A. Yates and Co. Branch Office, (J. Bourke, Rep.) Blenheim.

Nelson: Dalgety and Co., Ltd. Nelson.

Canterbury: Alex McDonald and Co., Cashel St., Christchurch.

Otago Central: C. E. Wallington, Omakau (Phone 6K).

Wakatipu and Southland: D. W. Thompson, Box 91, Queenstown, (Phone 42M).

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Farm Practice and Management

Linen Flax Stacking 1941-42

Southland Competition

IN THE spring of 1941, at the suggestion of Mr. J. A. Miller, Oreti, the Southland Provincial Farmers' Union Executive decided to inaugurate a competition for the best linen flax stacks built by growers on their properties. Two five-guinea cups were donated, one by Mr. J. A. Miller, Oreti, and the other by Mr. E. A. Cameron, Wendonside, then president of the Southland Executive.

The competition was divided into two classes on an acreage basis, one class being under 15 acres, and the other being 15 acres and over. As the competition extended over four factory districts — Otautau, Winton, Woodlands and Gore—it was decided that the respective fields instructor should make a preliminary inspection of stacks in the course of his normal duty of stack estimations, and at the conclusion of this should nominate the best stacks viewed for final judging.

Mr. John Stirling was later appointed as the sole judge, and made his inspection at the end of July, 1942. Forty points was the maximum allocated for workmanship, as displayed in the bottoms, building and topping off of the stacks. In addition the competition provided for the award of 30 points for the absence of waste at carting, and a further 30 points for the condition of the straw on arrival at the factory.

The percentage of waste was determined by the factory manager after carting, and the condition of the straw was based to some extent on the delivery bonus awarded by the factory manager to the grower. In this connection it may be taken as a basis that straw arriving in fair average condition would be awarded 15 points out of a possible 30. A number of reiss crops which were bought on an acreage basis were excluded from the competition.

Owing to the heavy tonnage produced, and with cartage in some districts not exceeding the factory needs in processing, it has been only recently possible to finalize the competition.

Some of the results are appended below.

STACKS UNDER 15 ACRES.

Competitor & District.	Workmanship. 40.	Waste. 30.	Straw Characteristics. 30.	Total.	Place.
Crone Bros., Apari	34	30	20	84	1
R. Fleck & Sons, Riverton ..	32	30	20	82	2=
L. & L. Saxton, Thornbury ..	34	29	19	82	2=
J. P. Johnston, Isla Bank ..	32	30	19	81	4
J. Cruickshank, Chatton ..	35	30	15	80	5=
B. Bagrie, Brydone	35	30	15	80	5=
W. A. Roxburgh, Ryal Bush	33	30	17	80	5=
J. A. Miller, Oreti	30	30	18	78	8
H. Smith, Waikaka	32½	30	15	77½	9
J. Hargest, Rakahouka ..	35	27	15	77	10

STACKS 15 ACRES AND OVER.

S. D. Irwin, Browns	37	30	25	92	1
M. Hishon, Centre Bush ..	32	30	28	90	2
D. H. Milligan, Dipton ..	34½	30	25	89½	3
A. D. Davison, Wreys Bush ..	30	30	24	84	4
I. Rumler, Browns	36	27	20	83	5
E. Johnston, Waimumu ..	34½	30	15	79½	6
J. McQueen, Waikaka	32	29	17	78	7=
C. R. Foster, Thornbury ..	31	30	17	78	7=
Diamond Bros., Hedgehope ..	33	27	17	77	9

Mr. Stirling's remarks were as follows:—

Crone Bros.: Five round stacks; short butts; good steep heads with good pitch on sheaves; straw bottoms; good workmanship.

R. Fleck & Sons: Three round stacks; fair workmanship; good wooden bottoms; thatched.

L. & L. Saxton: Three round stacks, two of which were very nice; straw bottoms; fairly well sprung and built; thatched.

S. D. Irwin: Five square very good stacks. Excellent root bottoms; good pitch; well sprung; well balanced heads; thatched.

M. Hishon: Four good square butts; plenty of pitch; heads mostly straw; wheat straw bottoms.

D. H. Milligan: Nine square stacks; fairly well headed and proportioned; good pitch; straw bottoms.

As a result of this competition the interest in stacking has increased noticeably in this the following season as exemplified by—

1. **Better bottoms, in many cases wood.**
2. **More pitch on the sheaves.**
3. **More spring to the eaves.**
4. **Heads steep, but not so steep as to make thatching too difficult.**
5. **Stacks better proportioned.**

—A. STUART, Instructor in Agriculture, Invercargill.

SHEEP DOGS
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Puppies with a box full of brains. Very best working blood from the heart of Scotland that made Great Britain world famous. Some of the most remarkable brains that ever invaded the hills and dales of England and Scotland representing the most classical working brains in the wide world.

They know how to handle their stuff! These puppies are chock full of the very best direct imported blood, tracing in a direct line to the most sensational trial winners of all time. Ready for removal now—2 champion litters of puppies.

No. 1 Litter—Sired by the sensational imported Scottish sire "BALAVIL BOY" Stud book 912. Ex Lilico "GYP" by Toss imported ex McNivens "MAY" imported. 5 guineas.

No. 2 Litter—By Broads "MOSS," ex the trial winning bitch (stud book) "NELL" imported daughter of Wilsons "CRAIG," one of the foremost working dogs in Scotland. These outstanding, classically bred puppies quoted at 5 gns.

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Pig Production

THE basis of success in pig production is management. Essential information that will assist farmers towards the adoption of successful management with the ultimate result of better pigs is available in the Department's free bulletin, "Modern Methods of Pig Production." Copies can be obtained from the Department's offices, Wellington, Auckland, Christchurch, Dunedin and Invercargill.

Radio Broadcasts

RADIO talks to farmers will be given from Station 1YA Auckland, at 7.15 p.m. on the following dates:—

September 6.—"Fungous Diseases of Citrus Trees," by Mr. A. M. W. Greig, Citriculturist, Department of Agriculture, Wellington.

September 13.—"Liming," by Mr. A. V. Allo, Instructor in Agriculture, Department of Agriculture, Thames.

September 20.—"Mastitis Research," by Mr. J. P. James, B.Sc., M.R.C.V.S., Veterinary Research Officer, Animal Research Station, Ruakura.

September 27.—"Young Farmers' Clubs' Session," by Mr. W. Alexander, Auckland.

Pig Industry Broadcasts

UNDER the auspices of the District Pig Councils concerned, broadcasts will be delivered in September as follows:—

1YA Auckland, September 16, at 7.15 p.m.—"Litter Production," by Supervisor, Bay of Plenty District Pig Council.

2YA Wellington, September 21, 7.35 p.m.—"Weaning to Four Months Old," by C. H. M. Sorensen, Supervisor, Taranaki District Pig Council.

2YH Napier, September 9, 7.30 p.m.—"Bacon Production," by Ivan H. Owtram, Supervisor, Tairawhiti District Pig Council.

3YA Christchurch, September 16, 7.15 p.m.—"Care of Young Pigs after Weaning," by Hector McIntosh, Supervisor, Canterbury District Pig Council.

Dig For Victory!

By all means . . . .

BUT PLANT FIRST seed potatoes from us. Don't get left this year, plant your potatoes as soon as weather permits.

PROVED POTATO SEED—
SUTTON SUPREME,
GAMEKEEPER,
ARRAN CHIEF, ETC., ETC.
In lots to suit purchasers.
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Time is Precious!

Railway Wagons Must Not Waste It

War production in New Zealand is rising like the tide and the need for rail transport rises with it. Every day from now on, the Railways must carry more wagon loads than they did last winter. Wagons will have to be worked harder than ever before; quicker turnround must be effected—standstill time must be cut down. How many precious hours can *you* save?

Less Standstill Means More Journeys

Slaughterings of Stock

THE following returns of slaughterings of stock at meat-export slaughterhouses and abattoirs for the months of May and June, 1943, have been compiled by the Livestock Division:—

District.	Cattle	Calves	Sheep	Of which Ewes were	Lambs	Pigs
North Island.						
Meat-export Slaughterhouses—						
Auckland	68,397	20,278	51,964	19,148	80,149	20,678
Poverty Bay-Hawkes Bay	22,000	6,100	70,599	31,330	121,186	4,927
Taranaki-Manawatu ..	44,395	2,571	48,591	24,750	160,838	23,951
Wairarapa-Wellington ..	16,916	3,546	41,888	21,604	121,515	3,687
Totals	151,708	32,495	213,042	96,832	483,688	53,243
Abattoirs	24,726	7,768	106,951	47,176	19,891	9,874
North Island Totals ..	176,434	40,263	319,993	144,008	503,579	63,117
South Island.						
Meat-export Slaughterhouses—						
Nelson-Marlborough ..	1,173	2	7,368	4,545	37,742	2,506
Canterbury-Westland ..	3,461	3,017	106,149	93,251	338,268	6,165
Otago-Southland	7,104	49	66,187	55,064	568,856	1,042
Totals	11,738	3,068	179,704	152,860	944,866	9,713
Abattoirs	10,656	2,233	46,666	28,689	7,572	3,517
South Island Totals ..	22,394	5,301	226,370	181,549	952,438	13,230
Dominion.						
Meat-expt. Slaughterhouses	163,446	35,563	392,746	249,692	1,428,554	62,956
Abattoirs	35,382	10,001	153,617	75,865	27,463	13,391
Grand Totals	198,828	45,564	546,363	325,557	1,456,017	76,347
Same Period, 1942— Meat-export Slaughterhouses and Abattoirs ..	208,256	28,927	399,706	247,623	1,308,324	125,299
Same Period, 1941— Meat-export Slaughterhouses and Abattoirs ..	174,488	27,317	504,217	335,799	1,473,513	145,613

Slaughterings of Pigs

The 29,582 pigs slaughtered at meat-export slaughterhouses and abattoirs during the month of June, 1943, were distributed in weight ranges, approximately, as follows:—

Up to 60lb.	716
61 to 120lb.	18,205
121 to 160lb.	8,209
161 to 180lb.	1,048
Over 180lb.	788
Sundries	616
	29,582

The grading of porkers was 91 per cent. of 1st quality, 9 per cent. of 2nd quality, and that of baconers was 84 per cent. of prime 1's, 12 per cent. of prime 2's, and 4 per cent. 2nd quality.

In the different weight ranges of baconers the grading was as follows:—

121-160	86%, 11%, 3% of P1's, P2's and 2nds respectively.
161-180	68%, 25%, 7% of P1's, P2's and 2nds respectively.

Covering Linen Flax Stacks

THIS season there is a distinct possibility that, in many cases, linen flax fibre now in stack on the farm will have to remain there for a somewhat longer period than has previously been the case. This unavoidable enforced stay on the farm means that, unless suitable protection against weathering is afforded, this fibre will deteriorate in quality and strength. In view of this it is imperative that the best effort be made to reduce weathering to a minimum.

Weathering in the stack can be reduced by the use of adequate cover, and various methods are adopted for covering. For instance, much use is made of wheat straw, which is either thatched or layered on and well tied down. Thatching with rushes and the use of bag or canvas covers are other methods employed.

The accompanying illustration shows two stacks which have been thatched with two layers of oat sheaves. This use of oat sheaves as a cover has been adopted by one or two growers in South Otago, and from all points of view the method is satisfactory. The round stack in the foreground is six yards wide and the oat sheaf cap required to cover this stack was contained in two small dray loads, the larger square stack requiring four dray loads. Any criticism which might be levelled at this method of covering might be in the encouragement of birds and subsequent damage. In the stacks illustrated bird damage was practically nil, for after fifteen months as a stack the oat sheaves cut into chaff which weighed from 80 to 90 lb. per bag.

This method of covering stacks offers to those farmers who have no available wheat straw but grow oats, a cheap, effective method by which they can provide the necessary covering for their linen flax stacks.

—J. G. RICHARDS, Assistant Instructor in Agriculture, Balclutha.

Don't

neglect disease and pests in the orchard. The Department of Agriculture will post you the free bulletin on the control of orchard diseases and pests by spraying.

POOR COUNTRY LADS..

Hitler sneered when he said in the early days of the war, "These New Zealanders, these poor country lads." But Rommel knows what country lads are made of; Rommel understands only too well why Churchill named the New Zealand Division "that ball of fire."

Yes, there are plenty of real New Zealand country lads over there, fighting it out on land, flying bombers or riding the slippery, slanting decks of a destroyer. And back here at home their fathers and brothers, wives and mothers are doing double time on the farms . . . playing their part in keeping the armies and the peoples of democracy well fed and fighting fit. They breed them tough in the country.

At International Harvester our job is to do all that's humanly possible for these fighters on the home front, despite the fact that many of our own staff are over there on the hectic side of the earth lending a hand.

But we're still getting shipments of McCormick Deering Tractors, and you can get one tagged for you if you get in early. We still can give you the I.H.C. brand of service, spare parts and repairs to help keep your farm machines plugging away till victory. So when you want help call on your local I.H.C. representative and if you find he's in the forces, as many are, write us direct. We won't let you down.

Harvesting and Hay Making Machinery

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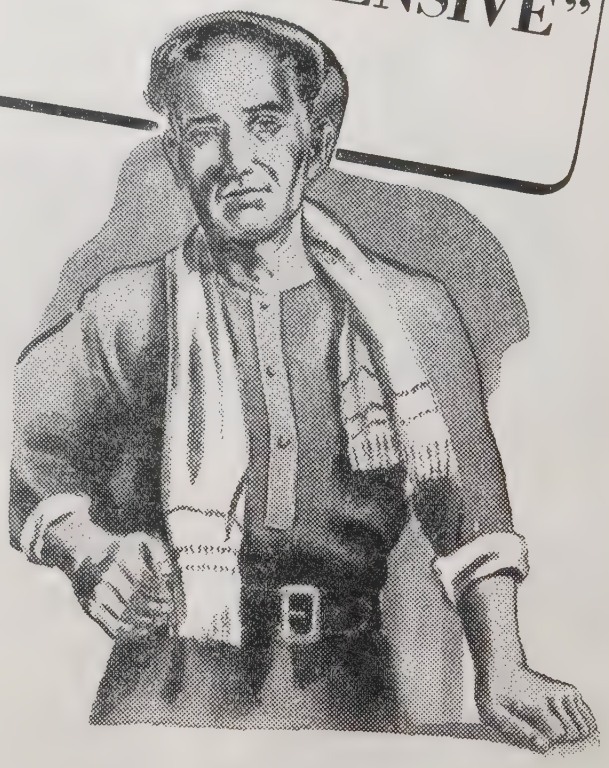
says JOHN TARRANT
Foundry Worker



I used to think that long overtime hours and week-ends at the foundry were plenty for a one-man war effort. That was till I got talking with some of the Middle East veterans. Then I came to. Nothing I could ever do would stack up against the least of their hardships. That's when I dug up my National Savings book and started putting in every bob I could scrape together. I'm too old to fight but, by jingo, I'm a one-man offensive on *this* front!

• • •

Ask yourself whether you, too, are honestly doing enough—quite apart from the brain and muscle you're exerting on your war job. Whether you add to your National War Savings Account or not is your own affair. But it's a fine way of helping your country to finance the purchase of war goods now—and of helping yourself when you need money to spend in the days of peace that lie ahead.

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WS.13.24

In the Orchard and Vineyard

Orchard Notes

Manuring, Cultivation, Planting and Spraying

AT THIS period of the year the principal work in the orchard which requires attention is as follows: Manuring, cultivation, planting and spraying.

The majority of orchardists will by now have completed the pruning of their trees. Where not completed, the work should be finalised as early as possible. All prunings should be gathered and burnt and not left lying about, thus eliminating a source from which disease may spread to the trees.

Attention should also be given to the treatment of wounds in fruit trees. Each year the orchardist is faced with the necessity of removing certain limbs from his trees. Unfortunately this operation is often carried out in a rough and unintelligent manner. A fine saw is necessary to remove the limb with as little injury as possible to the surrounding bark or cambium layer. This will leave a rough surface to the cut, so it is advisable to pare a thin layer off with a sharp knife until it is smooth. This will promote more rapid healing and give more resistance to the lodgment of fungus spores. The wound should then be coated over with some protective covering, such as bitumen emulsion or crude petroleum jelly. If left exposed without any protection the cut surfaces on the trees are very susceptible to the attacks of fungi and bacteria.

Manuring

It is essential that the orchardist should take every care to see that his fertiliser ration is applied to his orchard in such a manner so as to procure the best results from the limited quantity available.

Tree growth is an important factor in crop production and fruit trees must be made to grow in a manner which encourages fruitfulness. In fruit trees the maintenance of a moderate growth is desirable. A too vigorous growth is almost as unprofitable to the grower as a very poor growth and if possible both conditions should be avoided.

The cropping habits of fruit trees which are too vigorous in growth are not likely to be improved by the excessive use of fertilizers which in most cases would be wasted, whereas, on the other hand, trees lacking in growth would be greatly improved by the application of a liberal dressing of fertilizers.

For maximum effectiveness fertilizers should be applied to deciduous trees several weeks before bud movement. A manurial dressing may be greatly influenced by the method of application. It is certain that much of the material broadcast on the surface never reaches the tree's root zone, some being absorbed by surface plants and some held by the top layer of soil, and rendered relatively unavailable to the trees. As the essential plant foods in fertilizers are absorbed by the root system, it is imperative that they be introduced in the actual root zone of the trees, preferably by spreading them on the surface of the soil and ploughing under.

Cultivation

If fruit trees are to obtain the full benefit from their manurial treatment adequate cultivation of the soil is necessary. Spring ploughing should be commenced as soon as the soil is in a suitable condition. The beneficial effects derived from early ploughing can scarcely be overestimated and are generally recognized by all thoughtful and observant orchardists. It puts the soil in such a mechanical condition that it readily absorbs all possible moisture which in turn helps to decompose effectively any organic matter that has been ploughed under.

Prior to the commencement of the spraying season and before the soil dries out and becomes too hard it should be broken down into a fine tilth. This assists in conserving the soil moisture as much as possible and permits the roots to enter the broken soil and to establish themselves for the purpose of obtaining food supplies from the aerated soil during the spring and summer months. Cultivation around the trees where it is impossible to work with the plough should not be neglected. Trees dug or hoed round at this time of the year will require very little further attention during the season as constant working with discs and harrows will keep the soil fairly clear.

The planting of fruit trees which may have been delayed on account of wet weather should be completed by the end of August.

Spraying

Success in spraying is only achieved by thorough attention to details.

1. A thorough knowledge of the disease that it is intended to control is necessary.

2. Only spray specifics of proven quality which have been accurately measured out and properly mixed should be used.

3. In applying the sprays, careful attention should be given to coverage. Every care should be taken to see that the spray reaches the centre as well as the outside of the tree, also that the fruit and foliage receive a complete coating of spray. The value to be derived from the close attention to these details is very largely depreciated if the respective sprays are not applied at the correct period. In this respect, poisons for chewing insects and fungicides for fungous diseases must be on the foliage and fruit before any infection occurs if they are to be of any value.

4. Contact sprays for sucking insects kill only when they come in contact

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SPRAY SCHEDULE FOR STONE-FRUITS.

Period of Application.	Treatment.	Disease or Pest.
Dormant.	Winter oil 5 per cent.	Scales, red-mite, green aphis.
Bud-movement of leaf buds.	Bordeaux mixture 5-4-50.	Leaf-curl, shot-hole, bladder-plum.
Ten days later*	Bordeaux 3-4-50.	Leaf-curl, brown-rot, shot-hole.
Late pink†	Lime-sulphur 1-100.	Brown-rot.
Petal-fall.	Lime-sulphur 1-150 plus colloidal sulphur (50 per cent.) 2 lb. to 100 gallons spray).	Brown-rot, shothole, leaf-rust.
One month after petal-fall.	Ditto.	Ditto.
Seven weeks after petal-fall.	Ditto.	Ditto.
Five weeks prior to anticipated first picking.	Ditto.	Ditto.
Three to two weeks later.	Ditto.	Ditto.

*Required only where leaf-curl is particularly severe or where the first spray has been applied too early.
†This spray is important in districts where blossom infection is severe.

with these insects and sprays must be applied when they are present.

In last month's notes early spraying of stone fruits was discussed. Sprays recommended were an application of winter oil in the dormant period for the control of insect pests, and Bordeaux mixture 5 : 4 : 50 at bud movement for the purpose of fungous diseases, namely, leaf-curl, bladder-plum and shot-hole fungous.

The above schedule will serve as a guide for succeeding sprays for stone fruits.

When black and green aphis are prevalent, apply nicotine sulphate 1-800.

Where leaf-roller caterpillar and leech are present, apply basic lead arsenate 1½lb. to 100 gallons plus 3lb. hydrated lime.

On apricots the summer application of lime-sulphur and/or collodial sulphur should be dispensed with until ten days before harvesting.

Spreaders: Reference to the use of spreaders has been omitted, since their usefulness when combined with lime sulphur and sulphur sprays is doubtful, and also because arsenates frequently have spreaders incorporated in them.

—A. T. DOUGLAS,
Acting-District Supervisor,
Horticulture Division, Auckland.

Citrus Notes

Current Work in the Citrus Orchard

SPRING planting of citrus trees should be completed early, especially in areas likely to be dry during the summer months. Late planting gives young trees no chance to throw out roots before the hot, dry weather is upon them. Their limited root systems are then unable to support them and maintain growth under trying conditions. The result is a poor start, and sometimes stunted growth from which they may take several seasons to recover. Late, or poorly rooted trees are better kept for a season in nursery rows, to be given closer attention, and watered if necessary. They may then be moved, with a large ball of soil, to their permanent positions without suffering any setback. In establishing new plantations the land should be cover-cropped heavily to build up the soil. Improvement in soil condition, plus the advantage of setting out trees with good root systems, will more than compensate for any delay in planting out.

Shelter Belts

Shelter from prevailing winds is essential for citrus trees. If shelter belts have not been established prior to planting, fast growing temporary plants, such as Lopantha, are useful for the first few years. They are not suitable for permanent shelter but serve for a few years to protect permanent shelter plants and young trees. Intermediate quick-growing belts, planted between tree rows at intervals and kept trimmed, are useful until permanent shelter becomes established. Exposure to cold winds does not necessarily kill, but it does very severely retard citrus trees.

Spring ploughing and working in of cover crops should be completed early in the season. Discing of cover crops before ploughing gives better distribution of humus through the soil and helps rapid decomposition of the green material. Spring applications of fertilisers should be applied at this time of the year and worked into the soil. The fertiliser should be distributed in a wide circle around the tree. When the trees are large, the fertiliser should be spread over most of the orchard surface. Light digging or hoeing of the soil under the trees will reduce weed growth and will work in the fertiliser. Work the top few inches of soil under the trees, but do not dig too deeply or useful feeding roots will be destroyed.

Where dicky rice weevil is present, attend to tree bands, cutting back of weeds under trees, and removal of branches touching the ground.

Fertilisers

Shortage of commercial fertilisers makes even more necessary the fullest possible use of organic manures and mulches. Almost any non-woody vegetation, stack bottoms, farm manures of all kinds, contribute towards making up deficiencies. Green crops grown off the orchard make good mulching material and take nothing from the orchard soil. Do not place commercial fertilisers, or any mulching material, closer than about 18 inches from the bases of the trees.

Fowls produce excellent manure for citrus trees—but do not run more than a very limited number in an orchard. There is much evidence supporting the theory that incidence of bark-blotch is very much higher where large numbers of fowls are penned in citrus orchards.

Pruning

Pruning of citrus trees should commence about September and may be continued until about the end of November. Too early pruning opens trees to severe winter weather and frosts, while late pruning leaves trees exposed to hot summer and late autumn sun. Late pruning may also result in strong growth which cannot mature sufficiently to withstand winter frosts. Cutting out of small, used-up fruiting twigs and borer-infested branches may be attended to at any time of the year. Strong vertical "water shoots," crowded branches carrying little fruiting wood, and all spent wood, should be removed from the trees during spring pruning. At the same time, check for bark troubles and treat them.

Lemon trees need moderate opening up, removal or shortening of low sprawling branches, and shortening of high top branches to side growths. The centres should not be opened right out as with other deciduous trees. Young trees should be kept well trained while they can stand relatively hard cutting. They will then require less when they are older. Old lemon trees often resent very severe cutting. They are difficult to renew if they have been allowed to become dense or full of diseased or dead wood. Large wounds on old trees do not heal readily and

need periodical renewal of bitumastic paint or petrolatum which wears thin through weathering.

New Zealand grapefruit and sweet orange trees require less pruning than lemons. They are less inclined to spread and sweep the ground with long side branches, or to run out to weak unthrifty growth at the tops. However, they should not become overcrowded, especially while they are young. They require rather less thinning out than lemon trees, but all dead or diseased wood, and spent fruiting wood should be removed.

Spray Equipment

The new season's blossoming will bring another season's spraying. A few wet days before that time could be spent profitably checking over, repairing and testing spray equipment, whether stationary or portable, power operated or only small manual outfits. Motors, bearings, pistons, pump valves and plungers, packings, relief valves, taps, hoses, rods and guns are all likely to be found wanting after a period of idleness. Spare parts may not be obtainable and repairs to old parts during the progress of a spray may delay it enough to run past the most effective time of application.

Lemon Harvesting

These are the months of peak lemon harvesting and a busy time for citrus growers. That, however, should not mean careless picking or handling of the crops. Field boxes should still be kept in good order and not over-filled. Injured lemons may not be noticed in grading, but they may decay, and set others decaying, before they reach the consumers. Keep picking as up to date as possible. Do not let the trees waste fertilisers by growing lemons larger than the best sizes, or maturing them to tree-ripe stage. Look after your clippers. There seem to be very few new ones available and other means of picking lemons are not so convenient.

—I. L. NOTTAGE, Orchard Instructor, Tauranga.

Cool Storage Notes

The Selection and Handling of Fruit for Storage

FRUIT is harvested at a warm time of the year when the ripening process is very rapid. If the fruit is not cooled quickly after being picked, ripening continues at a very rapid rate, and it is only a few weeks, in the case of some varieties of apples, and a few days in the case of pears, when fruit reaches an over-ripe condition. When pears have reached a certain stage of maturity before storage, they will continue to ripen, even when held under ideal storage conditions.

Cool storage is most important, and could be used much more effectively than it is for maintaining the high quality of fruit placed on the early markets. Early pears give particularly good results when harvested at the correct stage of maturity and immediately placed in cool storage, and held until required for marketing.

When selecting and handling fresh fruit for storage, its perishable nature must be taken into consideration if losses are to be minimised when holding it in cool storage for long periods to supply market requirements later in the season. The highly perishable nature of fresh fruit, its susceptibility to bruising and damage when handled and transported, and to rot development, are important factors to be taken into account in the selection, handling, storage and marketing of fruits.

It should be borne in mind that, when fresh fruit is being harvested, high temperatures usually prevail, and any delay which may occur before cool storage is likely to cause serious damage and result in heavy losses later in the season.

Storage Costs

To reduce overhead costs on long storage fruit, it should be stored whenever possible in the areas of production, preferably loose in cases, and stacked to growers' marks. Packing should be carried out just prior to marketing. This procedure ensures, as far as possible, that the fruits are all sound when packed.

When packing has been carried out before storage,and deterioration of the fruit develops during storage to an extent that re-sorting and re-packing are necessary before it can be placed on the market, the losses of fruit, together with the additional handling and re-packing charges can make the storage of fruit for long periods most unprofitable.

Pears

Pears especially, should be placed in cool stores which are situated near to the orchard where they are grown.

When intended for export or long storage, pears should be harvested at the correct stage of their maturity for storage, carefully handled, and placed loosely in cases, immediately delivered to and stacked in the cool store to growers' marks. The flesh temperature should be quickly reduced to that recommended. When stored in this manner, the fruit may be easily and thoroughly examined from time to time during storage. When ready for marketing faulty specimens can be eliminated and the sound fruit wrapped and packed.

Cool Storage of Root Vegetables

IN VIEW of the greatly increased production of root vegetables to supply the requirements of the armed forces, the following information concerning the handling and storage of these vegetables may be useful, as exact knowledge of the correct conditions for storage seems desirable.

If the best results are to be obtained from the storage of root vegetables, it should be remembered that a good product is essential at the outset. Much of the success or failure in storing either fruit or vegetables depends on having sound material at the start. Care should be taken to see that vegetables are well matured and handled carefully. All cut, split, broken, bruised, or otherwise faulty specimens should be rejected, or placed aside for immediate consumption.

An important factor to keep in mind, to prolong their storage life, is that as soon as vegetables are harvested and have been prepared for storage, they should be cooled immediately. The stored material should be examined frequently during storage. If wilting is noted steps should be taken to increase the humidity of the storage

atmosphere. This can be done with a water vapour appliance fitted in the air delivery trunk. Under automatic operation the control of humidity by this means is practicable.

Carrots and Parsnips

Selection of Crops for Storage.—Carrots or parsnips from farms known to produce roots of poor keeping quality should not be stored.

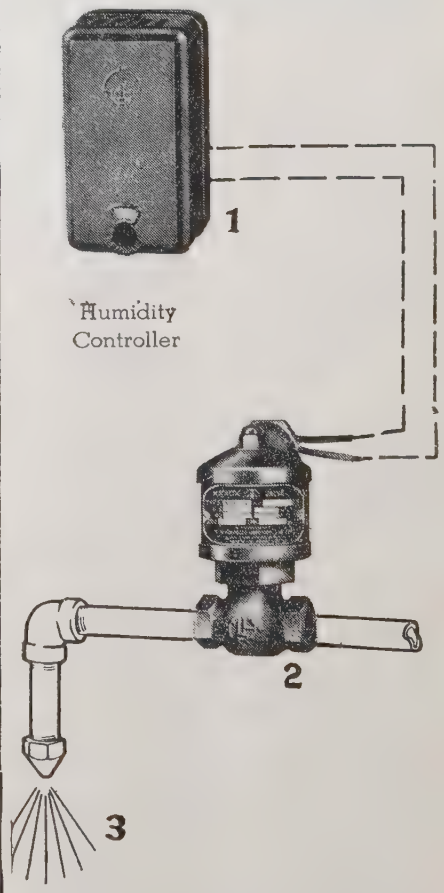
Harvesting.—Care should be exercised during harvesting to reject damaged roots as these are prone to decay during storage. Their inclusion will spread rots more readily through sound roots. Carrots and parsnips intended for storage should be topped about ½ inch to 1 inch long. Roots should not be washed for storage owing to the heavy damage suffered to the skin during the process.

Slatted crates are the most suitable containers. Sufficient space should be left between the crates when stacked to allow a free flow of air around the containers, as there can be little air circulation through the relatively dense mass of packed roots.

Storage Conditions.—Carrots and parsnips should be stored at a temperature of 34deg. F. with a high relative humidity of the storage atmosphere (about 95 per cent.). Low temperature injury has been observed in carrots at 31deg. F., and care should be exercised to see that parts of the store do not get as low as this. A relative humidity below 95 per cent. will bring about wilting of carrots and loss of weight; if above 98 per cent. it will promote rotting.

Ventilation.—The chamber should be blown out or ventilated at regular weekly intervals, as carbon di-oxide should not be allowed to accumulate.

When held under the above conditions sound carrots and parsnips may be held for from 10 to 12 weeks, and keep in good condition for about a fortnight after removal from cold storage.



Illustrating method of automatic control. 1. Humidastat. 2. Magnetic valve. 3. Vapour spray.

Beets

A careful selection is necessary for storage, and they should be held in crates. Tops should be left 4 inches long to prevent bleeding. Beets should not be damaged by washing for storage. A temperature of 32deg. F. and relative humidity of 90 per cent. to 95 per cent. is recommended.

Turnips

Turnips should not be cut or cleaned for storage; the tops should be left

(*Continued on Page 135*).

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Guide for the Home Garden

Planning Operations in Your Garden

IN THE July issue of the Journal mention was made of the desirability of having a garden plan, and, after all, a plan is merely an adjustment of circumstances which may arise from time to time in one's affairs. The main circumstance which calls for adjustment is the fact that we are at war. This has led to considerable disarrangement of our internal economy, and, so far as fresh vegetables are concerned, these have at times been in short supply, with high prices consequently ruling for whatever quantity may have been available. The experience has been seasonal, and mainly confined to late autumn, winter and early spring. The plan, therefore, which is considered desirable—it may even be necessary—to adopt, is to have supplies of vegetables, either growing or in store during the periods referred to above, when supplies may not be plentiful.

Soil Fertility

However urgent the growing of late-maturing vegetables may be—and there is no denying the urgency—it would be an almost unforgivable mistake if this were accomplished by depleting the soil of plant food reserves. That way lies future trouble and disaster. Continued successful results in a garden where intensive cropping is carried on can only be achieved by maintaining the soil in a highly fertile condition.

Distributing the contents of a properly made compost heap, applications of stable manure, seaweed, or other forms of organic matter which may be suitable for the particular type of soil in which production is being carried on, growing green manure crops, regular and periodic applications of carbonate of lime; in addition, good drainage conditions must be provided to ensure the healthy maturity of main and late crop vegetables. These are the principal methods by which soil fertility may be maintained. Proper cultural practices being assumed, the condition of the soil will be manifested in the quality of the vegetables produced.

Seed Sowing

Seeds for the production of autumn-maturing savoy cabbage should be sown, according to locality, from mid to late September, and for the later winter savoy variety from mid-October to early December. Cauliflowers which may take five to six months to reach maturity should be planted in time to ensure completion of harvesting before heavy frosts can damage the curds. Broccoli, Brussels sprouts and Scotch kale should be planted out not later than mid-November to mid-December, earlier in colder districts. These latter varieties are very hardy—kale particularly so—and will withstand severe frosts without sustaining damage. Seed for these varieties should be sown six weeks before the anticipated planting date.

Parsnips

Frequently this is a disappointing crop; but, so that the roots may be fairly well grown before winter, seeds should be sown in November. The matured roots, if properly grown, may be allowed to remain where they have been grown, if convenient, and will keep well, provided suitable weather conditions have been experienced and the soil is well drained.

Dont's

Don't

neglect the rhubarb crowns; keep them clear of weeds. It is a valuable spring vegetable.

Don't

grow more of one variety of vegetable than can be used to advantage by the family. This is bad planning and a manifest wastage of land, labour, fertiliser and seeds.

Don't

blame poor germination results entirely on having been sold inferior seeds. Try to improve the methods of sowing and the facilities for germination.

Don't

neglect the liquid manure tank. It should be periodically cleaned out and replenished with fresh cow or poultry manure.

Carrots

Where depredations of the carrot rust-fly are severe, autumn-sown crops should not be permitted to remain unduly long where they are growing. If not removed they will provide food for the pest during the whole season. Serious infestation may be minimised by sowing seed for the main or late crop during December—early or late according to locality—and the seed-bed made up as far as practicable from where the previous crop of carrots was grown. Horticultural napthalene, broadcast at the rate of 1 oz. per sq. yard, is considered the most efficient repellant for the carrot rust-fly. This should be applied during the period of growth. No damage to carrot foliage from this operation has been experienced.

Leeks

From the culinary point of view it would be difficult to name a vegetable grown in the ordinary home garden that could be considered of more utility than the leek. It is one of the hardiest of vegetables, and will withstand severe weather conditions, including frost. While not absolutely immune from disease, it is not generally affected to any appreciable extent, and is rarely attacked by insects. Well grown, the crop will be available for use from May to September and later. As soon as warm weather begins there is a tendency for the plants to "bolt" to seed.

According to the time the crop is required for use, seed may be sown from September to December, and the plants set out as soon as they have reached a height of 6 inches and developed stems about as thick as an ordinary lead pencil. A trench 4 inches deep may be opened and blood and bone manure applied in it at the rate of ½ lb. to 18 ft. of row. The trench can then be closed and the soil raked over. On re-opening the trench at the same place, the manure will be properly mixed with the soil where the leeks are to be planted. Unless the soil is friable and porous a dibber should not be used for planting. The plants should be set down deep enough to allow only the green tops of the plants to be above the level of the soil at the bottom of the trench. Six inches should be allowed between the plants in rows 12 to 15 inches apart. Provided the soil is very rich, the plants may be spaced 8 inches apart. An area of the garden which has just been cleared of onions should not be planted with leeks as a following crop.

Swedes

Seeds of Laings garden swede or Superlative may be sown during November and December. If the sowing follows a crop which has been liberally manured, superphosphate applied at the rate of 2oz. to 9ft. of row will be an adequate amount of fertiliser to bring the crop to maturity. Rows 12 inches apart, and the plants spaced to

6 to 8 inches in the row will permit ordinary development. Should signs of slowing up of growth become noticeable, organic liquid manure may be applied, but not continued when the roots become fairly well grown. Heavy manuring is not conducive to the production of swedes which will keep well in storage.

Turnips

Purple Prince and Milan Purple Top are recommended varieties, the seeds of which may be sown during early March. The latter is a quicker-maturing variety than the former; but both will remain in good condition for a considerable time during early winter. They will serve as a useful change for table use. Superphosphate 1oz. per sq. yard of bed will assist root development of the young plants.

Silver Beet

This vegetable (sometimes referred to as Swiss chard) is coming into more general use because of its relative immunity from disease and from the depredations of garden pests. It should not, however, be grown on badly-drained land if winter supplies are desired. Wet conditions on low-lying land during the winter period will have a detrimental effect on the development of the plants, and will induce attacks of fungoid diseases, which may be responsible for rendering the greater part of the crop unfit for domestic use.

Giant Broad White Rib—Fordhook, is the best variety for culinary purposes and for late autumn and winter supplies. The seed may be sown six weeks before planting out during late February or early March. Provided the soil is in reasonably fertile condition, an application of superphosphate, 2 oz. to 9 ft. of row, supplemented by liquid manure when the plants start to grow, should maintain the soil nutrient condition necessary for the production of a healthy crop.

Silver beet does best in the garden when the seedlings are grown in a bed or a box and transplanted. Rows 18 to 20 inches apart and the plants spaced 8 to 10 inches in the row will be sufficient to permit development of excellent plants.

Beetroot

Grown in the ordinary way, beetroot may be stored for winter use under much the same conditions as carrots.

September should be a very busy month for the home gardener, who, if his labour is to be adequately rewarded by cropping results, must during this month lay the foundation of his season's success.

Tomatoes

Without doubt the cultivation of this vegetable should receive more than ordinary consideration during the forthcoming growing period. In the July issue of the Journal suggestions were made for the steam sterilisation of soil in which tomato plants for use in the garden may be grown. Provided these have been carried out, sufficient soil should be on hand in which to sow the seed and subsequently fill at least two seedling boxes into which the seedlings will be pricked out. More than enough seedlings may be grown in a 4-inch flower pot, an old preserved fruit tin, or a box 4 x 4 inches by 6 inches deep. Whatever kind of receptacle is used, it should have drainage facilities for surplus water.

The soil used need not be packed tight in the container, just pressed down sufficient to prevent further dropping of the original level when the seed has germinated. Seed should be scattered thinly, gently pressed into the soil and lightly covered with some of the soil which has been passed through a fine sieve. If a heated house is not available, the container being used must not be placed where it will be exposed to cold temperatures. A glass covering should be provided, and over this a piece of white paper. These will require to be removed immediately germination starts, for which it is advisable to keep a sharp lookout. Seed for the early planting should be sown during the latter part of Au-

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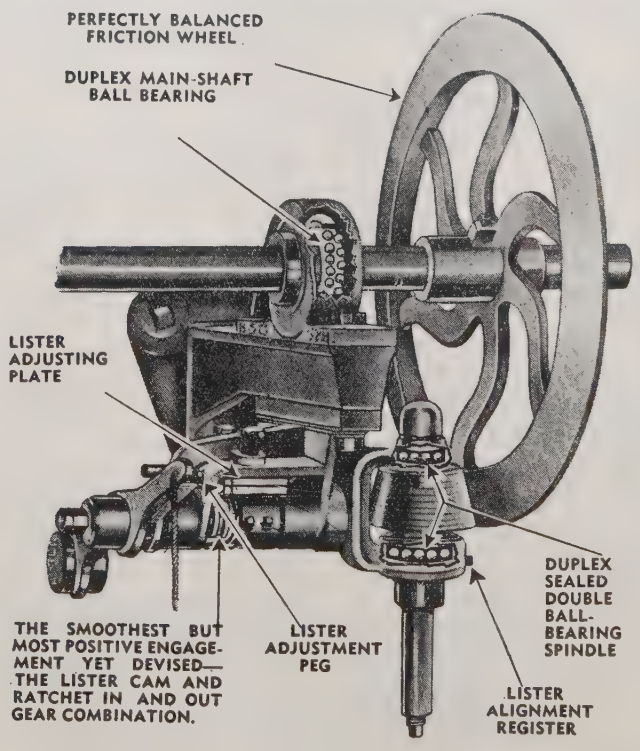
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gust. Seeds sown in late September will give ample time for production of main crop plants.

Golden Acre Cabbage

As soon as the plants from the seed sown in July are sufficiently well grown, they may be set out in the bed that has been prepared for them. This valuable summer cabbage should be planted in a rich, well-manured soil, and, given favourable growing conditions, will come to maturity following on the autumn-planted spring cabbage.

Potatoes

In districts which may be considered to be reasonably free from late frosts, a few early potatoes may be set out. The gain, however, is questionable, as the crop is rarely as prolific as that from seed planted later, when danger of frosts has passed. As the area of the garden to be used for the potato crop has doubtless been turned over for some time, it will now only require to be stirred up with a deeply penetrating hoe and raked over level, when the rows can be marked out ready for planting.

In putting out the "sets" it is desirable to exercise care to see that the shoots are not broken off. If the seed tubers are to be cut, it is an advantage to perform this operation immediately before planting takes place, and it will be a further advantage if the sets are planted in moist soil. Superphosphate and sulphate of ammonia mixed in the proportions of three of the former to one of the latter, by weight, and applied along the rows at the rate of ½ to 1 lb. to 6 yards, according to the fertile condition of the soil, will prove an efficient fertiliser. If available, and as a substitute for potash, a substantial dressing of dry wood ashes may also be applied.

Carrots and Parsnips

As soon as the soil is in reasonably good working condition, particularly if it is rich in humus, a small sowing of the vegetables may be made. Sow thinly in rows 12 inches apart. The subsequent thinnings may be used in various ways for kitchen use.

Asparagus

These beds should be carefully cleared of all weeds, and, as soon as there are indications of growth appearing, liquid manure made from nitrate of soda, dissolved at the rate of 1 teaspoonful to a gallon of water, may, with advantage, be applied.

Spring Cabbage

To prevent second growth appearing after the main head has been cut, the stumps should be removed at once. This will save the plant nutrients in the soil being used uneconomically, and will leave the reserve for the following crop.

Lettuce

Should growth appear to be slow, liquid manure made from farmyard organic material will be an advantage in assisting the plant to maturity.

Peas

Another sowing for successional production may now be made. Greenfeast is a good main crop variety and a reliable cropper. It must, however, be staked, and preparations should accordingly be made for this to be done.

For successional cropping, seeds of the following vegetables may be sown during mid-August and September: Beetroot, cauliflower, celery, lettuce, peas and radish.

—D. K. PRITCHARD, Instructor in Vegetable Culture, Wellington.

Seed Potatoes for Home Gardeners

LAST year home gardeners were faced with extreme difficulty in obtaining supplies of seed potatoes for planting in their private gardens, the shortage being brought about by the necessity of lifting the commercial acreage in the 1941-42 season from an extremely low acreage to a figure rather above normal.

When seed potatoes are in short supply, it must be the private gardener who suffers first. This is not because he is entitled to less consideration than the commercial grower—on the contrary he deserves every consideration. He is, however, in a much better position to improvise, and while his individual efforts may seem negligible, the total effort of **all** private gardeners amounts to considerable proportions.

It is the considered opinion of Mr. J. H. Claridge, Seed Certification Officer of the Department of Agriculture, that in times like these every private gardener can and should make himself independent of the usual source of seed potatoes and at the same time make an indirect but very important contribution to the war effort. Apart from direct purchase of seed potatoes, Mr. Claridge suggests the following ways by which sufficient sets for the ordinary home garden might be obtained.

Briefly these are:—

1. Sort over your supplies of table potatoes and put the smallest aside for planting. Put them out to green and sprout and by the time you are ready to plant them you may find they can be cut into two or more pieces, each with two or three sturdy shoots.

2. Approach your neighbour (especially if he was fortunate enough to have an appreciable area in potatoes last season). He may be able to supply you with some spare tubers which you should handle as above.

3. Purchase some table potatoes. Cut the rose end (i.e. the end with the cluster of eyes) off each. The cut should be made 1 to 1½ inches back from the rose end according to the size of the tuber. Instead of separating the pieces, however, place the cut surfaces into contact again and set aside carefully in a dark place for a week or two. By this time, the cut surfaces will have suberised (i.e. produced an artificial protection) and will not develop rots. The rose ends can then be put out to sprout and perhaps later cut again, while the balance of the tubers can be put into the pot. As an alternative to complete severing of the pieces, the cut can be made almost but not completely through leaving a little tissue to hold the pieces together. This can be broken away later when separating the pieces.

4. For those wishing to experiment, place a few potato tubers in a box of wet sand and cover them to a depth of about 4 inches. Place the box in a warm location—a seed frame is an ideal spot. When the sprouts are through the ground lift the tubers carefully, break off each sprout where it is attached to the potato and plant them out about 9 inches apart in rows two feet apart. They should be planted so that the green tip of the shoots come just above ground level. Later the plants are moulded up in the usual way. Tht tubers themselves may be replanted to obtain a further crop of shoots, or in dire necessity find their way into the kitchen.

Heavy yields should not be expected by this method, but up to seven shoots have been obtained from the first striking, with more later, so that the number of plants produced from each original tuber is considerable.

When cutting potatoes for seed purposes, it is desired to stress that the tubers should be planted immediately after cutting but the soil must be in good condition—neither too wet nor too dry. As an alternative to immediate planting, the cut surfaces should be kept in contact for a week or two until the surfaces have suberised and thus received protection from drying out.

Seasonal Work for Beekeepers

Spring Management in the Apiary

SPRING management in the apiary begins in August, but attention to colonies should be limited to a check up on the amount of stores available in the hives, and feeding where necessary. Demands on stores at this time of the year have a twofold purpose—to assist the bees to reach the necessary temperature of approximately 90° F. for brood rearing, and to provide food for the young larvae.

A normal colony headed by a young queen wil consume in the vicinity of 160lb. of honey from all scources when building up strength during the spring months, and unless there is a minimum of 15lb. of honey in each hive at all times, the rate of brood rearing will be retarded.

Feeding

It is good beekeeping practice to hold over combs of honey for supplementing stores in the spring. Feeding in this manner is carried out expeditiously reducing risks of robbing and chilling. When feeding must be done by supplying sugar syrup, a mixture of equal parts of sugar and water is about right for this time of the year. The syrup should be fed warm and as late in the day as possible, and no greater quantity should be given than the bees can take up and store overnight.

There are several methods of feeding, and two feeders in particular that can be recommended—the division board feeder and an improvised atmospheric feeder made from a 5lb. honey tin with a press in lid.

The division board feeder is of wood or metal and a little wider than a brood frame, but is otherwise of the same dimensions. Two frames should be removed from the side of the hive and the feeder fitted into the vacant space, with as little disturbance to the bees as possible. From a watering can with the rose removed the syrup can be quickly poured into the feeder, taking care that no syrup is spilt about. To give the bees a foothold, bracken, wire gauze, or wooden floats should be placed in the feeder.

Feeding from a 5lb. honey tin also gives satisfactiory results. Twenty or so frame nail holes are made in the lid and when filled the tin is inverted right over the cluster. The bees are thus able to suck the syrup through the holes. An empty super is added to the hive and a sack placed over the feeder and bees to conserve the heat of the hive and keep the syrup warm. An additional precaution against robbing can be taken by placing a sheet of newspaper over the super before replacing the hive lid. For some reason, neither bees nor wax moths like newsprint.

Honey tins are not as plentiful as formerly and a good substitute is found in the use of preserving jars whose lids have been removed and replaced by a covering of Indian head cloth, held in place with a rubber band. When inverted over the cluster, the bees suck the syrup through the material, the texture of which allows the syrup to seep through sufficiently slowly to enable the bees to take it up.

Some beekeepers prefer yet another method of feeding. The equipment required is a watering can with rose attached and a tin bath. Two or three empty combs are removed from the side of the hive and held over the bath, which is placed alongside the colony. The syrup is then poured from the watering can into the cells and when filled on both sides the combs are replaced in the hive. If carried out towards evening and if care is taken that no syrup is spilt outside the bath, feeding in this manner is quite effective. It is probably advisable whenever bees are fed to close the hive entrances with a few handfuls of green grass laid loosely in front of the hive.

Planning Operations

August is a suitable month for a general clean up in the apiary. The removal of any hive bodies where the bees have died out during the winter is a precaution against disease which may be spread by robber bees, and as a prevention against attack by wax moth.

Orderliness in the apiary is evidence of efficiency, which reduces the cost of production. If seasonal operations are planned in advance and worked to a schedule, the handling of colonies will be reduced to a minimum. Much time is lost through useless manipulation. Bees should receive only the necessary attention at the right time and no more.

With the present shortage of petrol and tyres, intelligent planning of apiary management is doubly important.

Hive Records

An important point not always appreciated by beekeepers is the necessity of keeping colony records. A book is probably best for the purpose, as a reference is always at hand without having to visit the apiary to obtain the required information. Each hive should be numbered with a movable metal disc, which, in the event of a colony being moved to a new location, goes with it. The hives should be re-numbered consecutively each spring, and where a hive has been moved, the number assigned to it the previous year should be placed underneath the new one; consequently the hive record is preserved from the first year of its existence. The record book should contain a page for each hive and bear the same number.

Care of Equipment

Efficient honey production demands the use of sound equipment of a standard design. While the inital cost may appear high, if the equipment is used to the best advantage and treated with every care, it will justifiy the expenditure.

Unless supers etc. are properly assembled, painted and kept under cover when not in use, they will quickly deteriorate. The ends of supers and other hive parts should be dipped in oil or red lead paint before being nailed together. Supers should receive two coats of paint made up of good white lead and raw linseed oil, with a little driers added. One gallon of paint prepared from 14lb. of lead and 3 quarts of oil is sufficient to cover 800 square feet of surface.

Some beekeepers use substitutes for paint, such as boiling in car sump oil in parrafin wax and coating with creosote, but the use of good paint undoubtedly justifies the additional cost if equipment is otherwise reasonably treated.

Importance of Good Combs

In order to take full advantage of the honey flow, sufficient equipment must be available when required. A plentiful supply of combs is necessary for the storage of nectar, which requires considerably more comb space, as some nectars contain as much as 80 per cent. of water of which the bees have to evaporate more than 60 per cent. It is evident that comb room considerably in excess of that required for the crop alone is necesary for the processing of the nectar.

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MILK: 2 glasses for adults daily. 3 or 4 for children. Drink it cold — use it in hot drinks — in soups, puddings and sauces.

EGGS: (when you can get them) 3 to 5 a week for each member of the family — 1 a day for adults is best. (Eggs used in cooking to be counted.)

MEAT or CHEESE or FISH: (don't forget liver and kidneys). One or more average helpings (3 oz.) daily.

GREEN VEGETABLES: One big helping daily for everyone. Boil them quickly in a little salted water and without soda.

FRUIT: Some fruit each day or tomatoes in season; at least one fruit or one tomato should be raw.

POTATO & ROOT VEGETABLES: One good helping of potato once daily. Cook in jackets and let the family peel them. Yellow vegetables as often as you can get them.

CEREALS & BREAD: Oatmeal for breakfast — wholemeal bread — "wheat germ" sprinkled on porridge or stewed fruit.

BUTTER: 2 or more tablespoons a day for each person.

Use any other foods to satisfy hungry appetites, but try and get these into the day's food.

BALANCED MEALS

- **Build and repair your body.**
- **Keep you fit and in good health.**
- **Give you energy for work and play.**
- **Prolong your life.**

FOR A HEALTHIER NATION

For the production of good straight worker combs, full sheets of foundation must be used. No greater handicap to successful beekeeping could be possible than an attempt to economise in this important matter. Good worker combs are necessary for breeding and storage, and to regulate the number of drones in the hive. Combs are subjected to considerable strain during the course of a season's work, and it is necessary that frames should be strongly made and be wired with non-stretching wire. Wires should be embedded into the foundation either by the use of an electric embedder or one of the spur wheel type. Where the former method is used, single groove frames are satisfactory and if the top wire is placed a quarter of an inch from the top bar, the necessity for fastening the foundation to the top bar will be obviated.

Wedge pattern frames are probably more suitable when embedding is not electrically done. Wedges should not be adjusted in one piece, but should be broken into about four parts and then fitted.

Under certain hive conditions stretching of the sheets of the foundation may occur, resulting in buckled combs. Consequently, it is of some importance that the foundation be not too wide. The space between the foundation and the bottom bar should not exceed quarter of an inch.

Correct spacing to allow the bees free movement between combs and the various parts of the hive is a feature of standard equipment. The bees will build burr comb where spaces much beyond three-eighths of an inch are allowed, and if the spaces are less than three-sixteenths of an inch the bees will join the openings with propolis. Correct bee spacing should be as near a quarter of an inch as possible.

—R. S. WALSH, Apiary Instructor, Auckland.

COOL STORAGE NOTES. (Continued from Page 130).

1 inch to 2 inches long. They should be stored in crates. The storage temperature should be held at 32deg. F. to 33deg. F., and a relative humidity of 85-90deg. Sound turnips should keep for from 4 to 5 months.

Potatoes for Long Storage

Potatoes should be carefully handled and all damaged tubers should be removed and the sound tubers placed in crates before storing as soon as possible after harvesting. They should be held at a temperature of 36deg. F. to 38deg. F .and a relative humidity of 90 per cent. Under these conditions potatoes may be held for from 6 to 8 months.

—A. A. POWELL, Cool Storage Officer, Wellington.

Notes for the Poultry Farmer

The Principles and Practice of Incubation

(Continued.)

By F. C. BOBBY,
Superintendent of Poultry Husbandry,
Wellington.

A LOSS of incubator space and a wastage in eggs may be avoided by the use of care and commonsense practice when selecting eggs for hatching purposes. Research work, closely supported by practical experience, has clearly indicated that certain types of faulty eggs give poor hatchability. It is obvious, therefore, that such eggs should be discarded for hatching purposes and used instead for table purposes. Of these types of faulty eggs, some may be quickly picked out by general observation, but others call for more careful detection. It is recommended that the following types of eggs should **not** be "set" in an incubator:

1. **Double-yolked eggs.**
2. **Obviously cracked eggs.**
3. **Rough-shelled eggs.**
4. **Heavily-mottled eggs.**

It is not uncommon to find eggs with rough shells, more particularly at the large end of the egg. Eggs with shells exhibiting a mottled appearance will also be found. Both possess porous shells caused by imperfect shell formation. Being porous, evaporation of moisture from the egg during incubation is much greater than is normal or desirable, resulting in reduced hatchability. If eggs with either rough or mottled shells are placed before a candling lamp, the imperfect and weak formation of the shell may be more easily observed. It may be added here that faulty shell formation of this type is often caused by lack of an adequate supply of shell-forming materials or by over-fatness in breeding hens. Occasionally it is an inherited weakness, more prevalent among high- than low-producing stock.

5. **Abnormal-shaped eggs.**—When breeding hens are allowed to become over-fat such birds may lay poor-shaped eggs, including those with a flattened side, ridges around the shell, and other abnormalities of shape. Such eggs may also have porous shells, and in all cases give reduced hatchability.

The above five types can be easily seen and discarded, but there are also three further undesirable types which require the use of a candling lamp, namely:—

6. **Shells with hair cracks.**—These are invisible to the eye, although in many instances they can be detected if the faulty egg is gently tapped with a sound-shelled egg, or with a fingernail. Those shells containing a hair crack give a dull or cracked sound which is quite distinctive.

7. **Eggs with a floating or tremulous air-cell.**—These can only be detected by the use of a lamp, when the air-cell instead of being fixed and clear-cut will be seen to be broken up with small air bubbles and unstable.

8. **Eggs containing blood-spots.**—Again, a candling lamp is required for detection. Although eggs containing blood-spots and faulty air-cells should not appear in quantity among eggs produced by a well-managed flock, when set in an incubator they give poor hatching results. Hair cracks, on the other hand, can form an appreciable percentage of breeding eggs where insufficient care is taken in the handling of these eggs between the nest-box and the incubator. In addition, it should be remembered that hair cracks may be caused by a hen laying her egg on the hard, wooden bottom of a nest-box when that box has been allowed to become short of a suitable nesting material.

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Since it is not possible for the average poultry-keeper under practical conditions to check the losses he may sustain by setting these three types of faulty eggs, the results of an exhaustive investigation into this problem are supplied as supporting evidence. The experiments quoted were carried out over a period of twelve months in 1936 by the writer at British Poultry Development, a privately-owned experimental station in the South of England. The eggs used were taken from both hens and pullets, and the breeds in use were Rhode Island Red and Light Sussex. The number of eggs used was sufficiently large to place beyond all doubt the significance of the results obtained. Only a summary of the full year's work need be included:—

Type.	Total eggs set.	Percentage infertile.	Percentage dead germs.	Percentage dead in shell.	Percentage hatch of all eggs set.
Normal eggs ..	85,325	14.1	5.3	15.8	64.7
Blood-spot eggs ..	451	23.0	10.0	23.0	43.9
Eggs with faulty air-cells	305	60.6	15.4	15.4	8.5
Shells with hair cracks	1,039	25.9	13.2	18.1	42.8
	87,120				

It is of interest to note the increased infertility in each group of faulty eggs tested, and in particular, eggs with faulty air-cells. Apart from the need for care when handling eggs on the farm, the results of this experiment indicate the real need for careful packing when hatching eggs are to be despatched by road or rail. Poor packing and careless handling can result in an excessive number of hair cracks and damaged air-cells.

Any discussion on the selection of eggs for hatching would be incomplete without reference to small eggs, or eggs of an incorrect colour for the breed concerned. Obviously, there is no suggestion that these two types of "faulty" eggs will have any undesirable effect upon hatching results, but it can be easily maintained that such eggs are undesirable.

(a) **Small eggs:** A 2-ounce egg has for long past been accepted in the principal poultry-producing countries as the **minimum weight** desirable for a hatching egg. If eggs weighing under 2 ounces are used for hatching purposes, there is every possibility of gradually lowering the average egg size of the laying flock concerned. Once satisfactory egg size is lost, it may take several seasons of good breeding management to restore this desirable factor. For safety's sake, it is a better practice to establish the minimum weight for a hatching egg at slightly more than a bare 2 ounces, say, 2 1-16th ounces.

(b) **Tinted or cream-coloured eggs:** Where a poultry-keeper maintains a flock of White Leghorns or any other breed which should produce a pure-white-shelled egg, it is usual to remove from the breeding-pen any bird laying a tinted or coloured egg. Similarly, breeders of birds which normally produce brown or tinted eggs will discard breeding hens laying excessively pale or white eggs. If this procedure is not practiced the number of birds producing undesirable coloured shells will increase in number, and will in time become extremely difficult to eliminate.

Storage of Hatching Eggs

Apart from the necessity of taking care while collecting eggs required for hatching purposes and giving regular attention to nest-boxes, certain precautions should be taken when storing hatching eggs. At no time either in the laying-house or during storage should hatching eggs be subjected to low temperatures around freezing point. Frost will split the shells, while low temperatures for any appreciable length of time will weaken the germs. Alternatively, high temperatures above 70 deg. F. are **equally dangerous**, particularly if the eggs so heated are subsequently subjected to a moderately low temperature. The high temperature will cause the delicate germ to develop and the following period of cold will then more easily kill or weaken it. Store hatching eggs in a room with a moderate temperature, ranging between, say 50 deg. F. and 65 deg. F. Hatching eggs should not be subjected to draughts or currents of air, since these will increase the evaporation of moisture through the shell.

The length of the period of storage or holding after laying and before setting is another important factor which will affect hatching. Under ordinary circumstances it should be the practice not to hold hatching eggs for more than ten days prior to placing them in the incubator. The best hatching results will be obtained from eggs retained for only 5-6 days, but no serious drop in hatchability should be experienced with carefully stored eggs up to 10 days. New laid eggs will hatch well within the normal 21 days of incubation, while stale eggs will usually go beyond this period.

The position in which eggs are stored, i.e., either vertical with the large end uppermost, or horizontal, is of little importance, providing the eggs are turned daily. This procedure is necessary to prevent the yolk, with the germ uppermost on it, from floating upwards towards the shell membrane. When this occurs the germ is liable to stick to the shell membrane, owing to the normal evaporation taking place at the surface of the albumen. Should this occur, the germ is destroyed.

In general, eggs required for hatching purposes should not be washed. Washing tends to remove the natural protective bloom, and allows, in consequence, an increased rate of evaporation, which is undesirable. Any clots of dirt or droppings adhering to the shell should be carefully scraped off in preference to washing the whole egg.

Practical Hints

Hens of light breeds should be mated with male birds **at least** a week before hatching eggs are required, and ten to fourteen days for heavy breeds, although fertile eggs will be found in many cases only three to four days after mating. On occasion, poultry-keepers wish to change a male in a special pen mating. If the male of the first mating is active it will not be safe to consider that the second mating is entirely operative and uninfluenced by the first male under 21 days. On the other hand, should a male die or be removed from a pen it will be found that the eggs will give satisfactory fertility for a period of ten days.

Chicks are now sexed at a day old, but so far there is no evidence to show that anyone has been able to indicate the "sex" of an egg before hatching. The shape of an egg is not a satisfactory guide in this matter. Finally, there is no evidence to support the suggestion sometimes made that if a crossbred mating is made the progeny from the hens, when mated at a later date in a purebred mating, will be affected or influenced by the first mating.

Internal Parasites of Livestock

CONSIDERABLE economic loss among livestock occurs annually because of the ravages of internal parasites, and it is the duty of every farmer to do his utmost to minimise these losses. The Department's **free** bulletin (No. 189) deals fully with the advantages of phenothiazine in the control of internal parasites. Its effectiveness against the various types of parasites, the methods of administration and the dose rates are fully discussed in this bulletin, which may be obtained from the Department of Agriculture at Auckland, Wellington, Christchurch and Dunedin.

Manures

are vital to the success of your garden crop. A free bulletin on "Manures and Manuring for Garden Crops" may be obtained from the Department of Agriculture.

Federation of Young Farmers' Clubs

Ninth Annual Report of N.Z. Federation of Young Farmers' Clubs

Ninth annual report of the New Zealand Federation of Young Farmers' Clubs (Inc.) presented at the annual general meeting at Palmerston North on Thursday, July 1, 1943, by the Dominion President, Mr. D. S. Ross.

I HAVE pleasure in presenting to you the ninth annual report of the N.Z. Federation of Young Farmers' Clubs. During the year under review the World War has been paramount in our thoughts and actions, and it has been brought home to us how completely we are involved in the fight for freedom. Many adjustments have of necessity, been made in our daily lives, and the need for effort by way of hard work and personal sacrifice has become apparent to each and every one of us.

As a Dominion and part of the Great British Empire, we are proud to be playing our part in the struggle for victory, and we have the satisfaction of knowing that it is no mean part. By the same token we, as an organisation, are also proud in the knowledge that our movement is contributing its share. Our members, both at home and abroad—in the battlefield and on the farm—are fighting manfully in freedom's cause, with the hope and trust that the outcome of our inevitable victory will make for a better world—a better world for the youth of today and tomorrow. We can at least glimpse the first signs of peace approaching, and the sight should spur us on to still greater endeavour. Peace may come soon, or it may still be far off—but nevertheless it will come, and it must not find us unprepared, for when it comes we shall have further grave problems to face. We have first to win the war—but we must not blind ourselves to the fact that even then we shall have a great task before us: the task of reconstruction and rehabilitation. To this end we, as an organisation, must first of all keep faith with our members in the fighting forces overseas, and honour our promise to them to hold the Y.F.C. movement together; we must also realise our duty to the younger generation—the youth of today, so soon to be the farmers of tomorrow. The present worth and the potential value of our organisation are such that we would be betraying our trust should we allow our endeavours to slacken. We would be lacking in a sense of responsibility towards our movement, and falling down on the very aims and ideals which we affirm.

So far as our organisation is concerned we are still passing through a critical period. During the past year ten more clubs have found it impossible to carry on and have gone into recess; this, however, has been partially offset by the fact that two new clubs have been formed and three others that were in recess have been revived. We have satisfaction in the knowledge that the greater number of clubs still functioning have been able to increase their membership by enrolling younger members—this in itself pays a tribute to the keenness and interest that is being maintained within those clubs that can still carry on.

Club Membership

The previous year saw grave depletions, not merely of membership, but of clubs. Unfortunately, with the outbreak of war in the Pacific, many clubs that were still actually in a position to carry on, took the line of least resistance and closed down. In the North Island, in particular, whole districts went into recess, for no other apparent reason than that their memberships were falling off and the difficulties in connection with transport had become more acute. In the majority of cases no real or concerted effort was made to hold the clubs together, and not only can the apathy of the club members themselves be blamed for this, but quite a lot of the responsibility can be laid at the door of the district committees. I am more and more of the opinion that these committees can constitute our strongest link—the link between the clubs as

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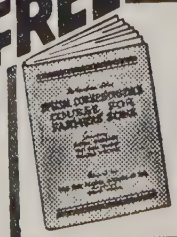

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units and the Federation as a whole; unfortunately in many districts they have proved our weakness, and instead of encouraging their clubs to carry on, individually and collectively, they have failed to realise their responsibilities. This may be thought to be a rather sweeping statement, but nevertheless it is a true one, and is borne out by the fact that today the strongest clubs are to be found where the district committees are the most active.

The following table, indicating the position of the clubs, gives very interesting and illuminating comparisons:

Council Area.	Before the War.	July, 1941.	July, 1942.	Present Date.
Otago-Southland	35	28	12	12
Canterbury	38	27	18	17
Wellington	77	53	20	18
Auckland	53	32	17	15
Total	203	140	67	62

The above figures, whilst showing the immense "drop" during the previous year, at any rate disclose a very definite "slowing up" of the retrograde process during the past twelve months. At the same time never at any stage should we view this with complacency. Such a course would be fatal. We may have enough faith in the Y.F.C. movement to feel that, come what may, it will survive—but that faith alone is not, in itself, sufficient. We cannot afford to slacken our efforts; we must be "up and doing," and see that all units of the organisation play their part—and we must help them to give of their best. One of the strongest arguments—apart from our promise to our fellow members overseas and our duty to the younger generation—that was brought to bear, about a year ago, in answer to suggestions from some quarters that the Federation should go into recess, was the knowledge that the stronger and more active clubs would have carried on, and that to deprive them of their organisation would have been to penalise them severely. That is clear proof of our duty; as a Federation, as Councils, and as District Committees, we must plan and organise, encourage and sustain, and by example and precept strengthen our existing units and assist them to carry out the ideals and objects of our movement. Side by side with this must go the determination to lose no opportunity to inaugurate new clubs and to revive clubs in recess wherever the possibility appears.

An example of breaking new ground is given in the recent formation of a club in a military camp at Palmerston North. The gap that can be filled by clubs of this nature is fairly obvious. The Army Education and Welfare Service recognises the usefulness of such clubs, and the possibilities of the formation of others should not be lost sight of. Apart from their immediate worth and value to the young farmers and others in camp, their potentialities in regard to post-war activities are to be considered, both from the point of view of increased membership and the encouragement of returned men towards the land. The formation, during the year, of a Young Farmers' club in a prisoner of war camp in Italy by Sergeant R. G. Montgomery, a member of the Meanee club, Hawke's Bay —holding five meetings a week, with an average attendance of over 200—should certainly inspire us to keep our organisation alive for him and his fellows when they return; the effects of a club such as this must eventually manifest themselves in the desire on the part of many non-farmer members to sooner or later take up farming as a living. Sergeant Montgomery is to be congratulated on his initiative in forming a club under such circumstances, and thereby doing good service by creating interest for those similarly placed to himself.

The Dominion executive committee has met twice since the last annual general meeting of the Federation at Wellington in November, and at Christchurch in April last. The first of these meetings was rather poorly attended, partly on account of the railway restrictions imposed at that time; at the latter meeting, however, there was particularly good representation, all four councils sending delegates. These meetings have been productive of very good work; some excellent recommendations from the councils were dealt with and passed on to the various units of the organisation.

A scheme for the inculcating of "Leadership" among the youth of the farming community has been developed, and a move is under way in the direction of extending the Y.F.C. movement throughout secondary schools and district high schools with secondary departments. There are now five clubs in schools; one of them (the Ashburton Technical High School club) has been established for over four years, and is functioning very successfully; another (at Taihape) has recently been formed. With the propaganda and organised effort that is planned, it would appear certain that a number of school clubs will come into being. These, as pupils leave school, should provide an excellent recruiting ground for existing clubs, and in some cases possibly lead to the establishment of others, besides giving to the younger lads the opportunity to participate in the Y.F.C. movement. No activities on a national scale have been undertaken on account of the many difficulties prevailing. A national essay competition has, however, been arranged, and it is hoped that many members will take part; the subject, "Citizenship, and the part that can be played by the Young Farmer," is one that should appeal, and if the standard is up to anticipation, some useful ideas and suggestions may be developed, and some valuable publicity also result.

Club Activities

Club activities, during the year, have in most cases been necessarily confined to meetings, with occasional field days. All units have been thrown more upon their own resources, and with very few exceptions appear to be facing up to the situation. They have realised that a special effort was required of them, and they have carried on, organising debates and impromptu speaking amongst their members, and drawing for lecturers on farmers and business men within their own areas—men whom they had, perhaps, previously overlooked, but whose knowledge and experience has proved of great value. In some areas where a great deal of transport has not been involved, inter-club activities such as debates, and even in some cases stock-judging, have been carried on, and where the district committees have kept alive they have been able to play their part in encouraging these and in helping the clubs generally to function. The Y.F.C. Experimental Scheme, whereby members have the opportunity to co-operate with the Department of Agriculture in plot trials, etc., is still being carried on, though to a lesser extent than last year, mainly on account of so many members being called up to serve in the forces. The recent decision to release young men up to 20 years of age from military obligations will doubtless have its effect on this and all other club activities, as membership depletion has been one of the greatest difficulties with which many clubs have had to contend.

Once again it has been amply demonstrated that the district committees are among the most important units of the Y.F.C. organisation. Where they have remained active they have kept most of their clubs together and assisted them in solving their problems. It is unfortunate that at a time like this, when their services would have been of the utmost value to their committees, many of the Departmental officers acting as district secretaries have, on account of the extra duties they have been carrying out in direct connection with the war effort, found themselves able to devote only a minimum of their time to Y.F.C. work; some of them have found it practically impossible to keep in touch with the movement at all, and as a consequence their district committees appear to have gone completely out of existence. No blame attaches to these officers—in fact

New Zealand Federation of Young Farmers' Clubs (Inc.)

Balance Sheet 1942-43

LIABILITIES.

	£ s. d.	£ s. d.
To Sundry Creditors—		
Affiliation fees received but not yet disbursed to Councils: 1942/43 ..	21 8 0	
1943/44 ..	7 7 0	
		28 15 0
Affiliation fees payable to Councils but not yet received		23 10 9
Accumulated Funds Account—		
Balance as at 1st May, 1942	334 11 6	
Plus Excess Income over Expenditure	73 12 7	
		408 4 1
		£460 9 10

ASSETS.

	£ s. d.	£ s. d.
By Cash at Bank		318 10 2
Sundry Debtors—		
Affiliation Fees Outstanding		23 10 9
Credit Sales		19 10
Stock on Hand		12 9 7
Bell & Howell Projector ..	93 10 0	
Less Depreciation	14 0 6	
		79 9 6
Cups and Trophies ..		25 10 0
		£460 9 10

we would be ungrateful if we did not remember the splendid work that they have done for the organisation in the past, and that many of them are still doing. The fact remains, however, that in some instances committees could have been held together had more keenness and initiative been displayed by their own officials, who would seem to have relied too much in the past on the Departmental officers. Their apathy has been responsible for the lack of enthusiasm on the part of all others concerned, clubs and club members alike. At this juncture I would like to express the Federation's praise and gratitude for assistance given to the Y.F.C. movement by the Department of Agriculture and its field officers generally. I am not exaggerating when I state that had it not been for the efforts of the Department the Y.F.C. organisation would not have achieved the progress that it made prior to the war, nor would it be in as sound a position as it finds itself today.

The movement at the present time is largely dependent on a younger membership—a membership that has lost (only temporarily, we hope) the services of many of the older and more experienced club leaders. I would appeal to the older farmers and others to assist by acting in the capacity of advisory members, and to help in training up these younger members, many of whom, though they have the keenness, lack the necessary experience and initiative. It is interesting to note that some clubs, which otherwise might have been forced to close down, have strengthened their membership considerably by the enrolment of the "under-eighteens," and are taking every care to ensure that their meetings and activities generally are sufficiently attractive and interesting to hold the younger members together. I trust that these younger members will appreciate to the full the real aims and objects of the movement, and will all make themselves conversant with our rules and regulations, and thus promote the orderly and businesslike conduct of meetings—matters of prime importance as affecting the success of the Y.F.C. organisation.

I would remind club members, and all associated with the Y.F.C. movement, that the organisation can carry on and make progress **only** if they put their best into it. It is pleasing to note, in many of the districts that I have recently contacted, a more cheerful spirit and a greater determination in regard to the Y.F.C. movement. Without being unduly optimistic, it appears to me that having as an organisation gone through so many trials and stood the test, we have every prospect, now, of "making the grade"; but this can only be achieved by continued and concerted effort. We **must** win the war—but the Y.F.C. movement represents so much to the youth of the rural community, and so much to its members in the forces overseas, that, whatever sacrifices we are called upon to make, it should be one of the last things to go. We must pull together, using our organisation, as we have in the past, to assist in the war effort in every possible way, and, remembering its potential value in regard to post-war problems, we shall then be ready to build it up again to much more than its pre-war strength; and out of the disappointments and misfortunes of the war years will emerge a movement actually strengthened and held together with that indomitable spirit to carry on.

Members in the Forces

This report would be incomplete without a reference to our members overseas—there are more than 3,000 in the forces. Some of them have fallen, and to their relatives we express our deepest and sincerest sympathy. Letters have been received from many of our fellow members overseas, all of them displaying an eager interest in Y.F.C. affairs, and the desire that the movement should be carried on. My message to them is that we shall not let them down—and when they return we will extend to them a welcome, both individually and as an organisation—**their** organisation. To those of our members who are fighting "on the home front"—assisting in the necessary production for both our military forces and our civilian population—I would say "carry on with the good work!"; your task is as necessary and as important as fighting. When the war is over and we are all again united, we can collectively strive towards a brighter outlook and a better world—and we at home can start now!

Appreciation

I wish to thank, on behalf of the Federation, the Minister of Agriculture (the Hon. J. G. Barclay) for his interest and active assistance during the year. I thank the officers of the Department of Agriculture, who have encouraged and fostered the various units of the organisation in spite of their own problems. I especially thank Mr. R. B. Tennent, Assistant Director-General of Agriculture for his untiring efforts during his term of office as Director of the Fields Division, and Mr. P. W. Smallfield, now Director of the Fields Division, whose co-operation is greatly assisting our organisation in overcoming some of our present difficulties. I thank the N.Z. Farmers' Union, A. & P. Associations, Breed Societies, Agricultural Colleges and

Research Institutions for their help and encouragement. I thank the W.D.F.U. and all others who have helped in any way during a most difficult year; and I especially thank Mr. S. Freeman, our Dominion Organisation Secretary, for the work and thought he has put into the movement, which has, in no small way, been responsible for the consolidation that has taken place during the past twelve months.

In conclusion I would suggest to you that while it is perhaps easy to be pessimistic, it is more encouraging and helpful to be optimistic; and I consider that, at this stage, we are justified in feeling that, so far as the Y.F.C. movement is concerned, we appear to have passed the crisis. There must, however, be no "let up"—we must strive with courage and resolution; and I would urge that each and every one of us should take as his watchword "Look Ahead!", and remember that we are merely trustees for the generations to follow; and that it should be our earnest endeavour to leave this movement in a sounder and a stronger position than when we joined it.

(Signed) D. S. ROSS,
Dominion President,
N.Z. Federation of
Young Farmers' Clubs.

Reports on Club Activities

WESTERN SOUTHLAND.

Orepuki.—Two new members enrolled. Club debate, "That Machinery has contributed to the Happiness of Mankind." Suggestions for a field day at Invercargill. Decided that two teams should be entered for the inter-club debate at Invercargill. Reports on the annual meeting of the Otago-Southland council, by D. McPherson (delegate) and other members who attended. Twenty-four members were present at the monthly meeting out of a membership of twenty-nine. A field day was held at Pahia; there were nine entries in the dog-trials, supervised by Messrs. W. Pollard and T. Cowan, and twelve entries in the calf competition, supervised by Mr. F. Hogg, who gave a talk on the points of a beast. A grass-plot demonstration was given by Mr. A. Stuart, Department of Agriculture, who identified the various species of grasses and explained the trials as the members proceeded over the field. There was an attendance of 45, which included 24 older farmers and other interested persons.

Wyndham.—Arrangements for a field day. Address by Mr. L. Harper, on "Starting out on a Farm." Ten members were present out of fourteen.

DUNEDIN.

West Taieri.—Annual meeting. Officers elected: Advisory president, Mr. F. D. Reid; chairman, W. A. Young; vice-chairman, A. M. Reid; secretary and treasurer, L. J. Doherty; delegates to district committee, W. A. Young and A. M. Reid. All members serving overseas were elected as honorary members. Thirteen members were in attendance.

NORTH OTAGO.

Enfield.—Discussion on Y.F.C. essay competition. Talk by a former club member, Mr. W. Yuil, on his experiences in Fiji; the speaker described the planting, cultivation and harvesting of sugar-cane, and exhibited some interesting snaps of the island, which were very instructive. Fourteen members were present out of a membership of twenty-one. At the previous meeting eleven members were present, and were addressed by F. Forrest, a club member, on "Bee-Keeping," the speaker explaining the work with bees during the honey-flow.

SOUTH CANTERBURY.

Geraldine.—Lecture by Mr. Raeside on "Soil Fertility," followed by lantern slides exhibited by Messrs. C. C. Leitch and Wallace. Eleven members attended.

MID-CANTERBURY.

Methven.—Arrangements for annual dog-trials. The chairman, R. Wightman, gave a report on the annual meeting of the Canterbury council. An 80lb. bag of white clover seed was donated to the club by Mr. F. G. Oldfield as a trophy for a pasture-judging competition. Members gave five-minute speeches on either of the two subjects, "The Future of Linen Flax growing and milling in New Zealand," or "The Maintenance of World Order and Peace after the War." The speeches were judged by Mr. Tempero, for the cup presented by Mr. Dunkley; placings: A. McKay, first; J. McKendry, second; D. Campion, third. There was an attendance of twenty-eight members.

CHRISTCHURCH.

Ellesmere.—Five letters were read from club members overseas expressing thanks for parcels sent to them by the club. Discussion re Y.F.C. folder and also the co-operative experimental plot scheme. Debate with Ellesmere branch of the Farmers' Union, the subject being "Is it possible to maintain the Farmlands of Canterbury for the next 100 years in their present productive state under arable farming by modern methods?" The debate was judged by Mr. W. Cartwright, who awarded the decision to the Farmers' Union by 245 points to 239. At the following monthly meeting two more letters were read from members overseas who had received club parcels. One new member was enrolled. Decided to hold a ladies' evening at some future date, to take the form of a social evening. Address by Flight Lieutenant E. W. Barnett, a past president of the Y.F.C. Federation; the speaker gave members an interesting insight into the general life of an airman. Twenty-two members attended the former meeting and 15 the latter.

MARLBOROUGH.

Flaxbourne.—Annual meeting. Officers elected: Advisory president, Mr. W. S. Morrin; chairman, D. Johnstone; secretary, J. Forsyth. The programme of lectures for the ensuing year was discussed. Twelve members present.

HOROWHENUA.

Levin.—Dance to be held, to raise funds for parcels to be sent to members overseas. Address by Mr. R. P. Gilder, Government veterinarian, on "Sterility and Abortion."

MANAWATU.

Bunnythorpe.—Two visitors from Feilding club, one of them being Mr. Beazer, chairman of the Manawatu district committee. The growing of roots for the Women's Institute show was discussed. Mr. Hewitt, of Massey College, to be asked to speak at the next meeting. The sum of £4/10/- raised for the Overseas Parcels fund by means of a raffle. The speaker for the evening was Mr. B. Lowe.

Rongotea.—K. H. Noel elected chairman, in place of F. W. Crocker who had resigned on account of leaving the district; R. O. Gloyn elected secretary, pro tem; secretary to be appointed at next meeting. The chairman gave a report on a field day held at Mr. H. J. Lancaster's, which was attended by members of the Taranaki Regiment Y.F.C. Address by Mr. L. H. Yarral on places that he had visited in the U.S.A., and also the activities of movements corresponding to the Y.F.C. in that country. At the previous meeting a talk was given by the Rev. Gould on his travels from London to Malta. There were eleven members present at both meetings.

Taranaki Regiment Y.F.C.—Card evening; a most successful evening, at which a good time was had by all! A field day was held, which took the form of a visit to Flock House Training Farm, Bulls. Twenty-seven members made the trip, and put in a most interesting day. The farm buildings were inspected, including the woolshed where crutching was in progress, some of the members "trying their hand." A comprehensive survey of the nearer paddocks of the farm was made, the manager, Mr. J. G. Mitchell, explaining the system of breaking in, etc., of the land. In the afternoon a journey was made by lorry to the back of the station, where the systematic afforestation scheme was inspected. The Y.F.C. organising secretary, Mr. S. Freeman, accompanied the party.

SOUTHERN HAWKE'S BAY.

Dannevirke.—Arrangements for a field day: programme suggested to comprise demonstrations on Romney and Southdown sheep, Aberdeen Angus cattle, and the working of a sheepdog. Chairman and secretary to finalise details. August meeting to be advanced by a week to allow High School members to be present. Welcome extended to Mr. G. Cammock, an adivsory member. Clauses I and II of the Y.F.C. Constitution read to the meeting. Short talk by V. Cammock, a club member, on "Share-working in place of Reward by Wages." Address by Mr. H. M. Tatere, on "Maori Topics." The speaker covered Maori education and development, and also the Maori war effort. The address was most interesting, and members showed their interest by the questions that were asked. Eighteen members were in attendance.

SOUTH TARANAKI.

Alton.—Annual meeting. Mr. K. Williamson took the chair. The executive committee was reappointed and given authority to draw on club funds for presentations to members on final leave. Members present stood in silence as a mark of respect to the memory of Pte. J. N. Drury, a club member, reported killed in action. The attendance was poor, only six members being present. This club is carrying on with an executive committee, in order to maintain contacts and keep "alive"; this is definitely to be preferred to going into absolute recess, as when the time comes the opportunity can be seized to revive the club's activities.

TE KUITI.

Otorohanga.—Discussion on presentations to members going overseas; decided to make a standard presentation. Commencement of Impromptu Talk competition; speakers: G. Neustroski (Milking Machines); G. Clark (Choosing Sites for Farm Buildings); V. J. Reed (Signalling and Communications); W. J. Rankin (The Type of Farm I would like to have); C. Park (Points of a Show Cow); G. Dodunski (Points of a Show Calf). Thirteen members attended out of a total of thirty.

BAY OF PLENTY.

Paengaroa. — Arrangements for forthcoming debates; decided to hold a dance afterwards. Secretary instructed to forward a letter of congratulation to the members of the Te Puke club, on the manner in which they put over their recent radio-broadcast talk. Letters of thanks to be forwarded to all who had helped on the recent stock-judging field day. An interesting paper on "Afforestation," written by W. Black, was read by J. M. Hodges, after which members took part in interesting discussion on the matter. Twelve members were present.

Te Puna.—Arrangements for dance. Resolved that the club pay Journal subscriptions for

(Continued on Page 142).

Health Notes for the Farm

Watch That Common Cold

Contributed by the
DEPARTMENT OF HEALTH

HERE it is again—winter—with all its chills and cheerlessness. Snuffles and sneezes and red noses have again been in the fashion, and again the lurking army of germs is scouting around for a chance to get in some deadly work—just waiting until our bodily resistance shows a weak spot. And in they go—right through that weak spot, right through our first line of defence, headed for all sorts of mischief.

Just as summer breeds its own special brands of pain and penance for the human body, so does winter wake up the slumbering hosts of trouble-makers.

First and foremost among them is the germ that causes the common cold. It is not an ordinary germ. It is a virus that sets a cold going, and stirs up other germs living in our nose and throats. In passing, it may interest you to know that the difference between a germ and a virus is that a germ can be seen under a microscope; a virus is invisible under the most powerful microscope. But they have one thing in common—they can both cause disease.

Not a Simple Upset

To get back to the cold. One of the biggest mistakes the average person makes is to treat a cold too lightly, to brush it off as if it were something of no importance. No one likes to make a fuss of a cold. It makes you look a bit soft, doesn't it? and some of your bright-minded friends are liable to become a little vocal about it—forget all that. Just remember that a cold isn't the simple little upset you might like to think it is. Just because it doesn't knock you out, don't get the idea that it can be treated casually. A cold is potentially a dangerous affliction, and it should be treated as a dangerous affliction.

Two special dangers accompany a cold. In the first place, the early signs are often the same as the early signs of more serious contagious diseases, such as influenza, measles, scarlet fever and whooping cough. You might be neglecting a cold at the very time when skilled medical care is essential. In other words, it might not be the kind of cold you think it is.

In the second place, long-continued colds—the colds you can't shake off, may pave the way for an attack of pneumonia, or tuberculosis, or even a chronic infection of the nose, throat or ears.

The early proper treatment of colds will prevent much sickness and loss of time, and of course will do much to prevent the onset of the serious consequences referred to above.

Advice at the Outset

At the first sign of a cold, such as a tickling, soreness, or dryness of the throat, sneezing, or a running nose, start treatment at once. Rest in bed, or at least indoors. This is particularly important if you are weak, because weakness may be a sign of influenza.

Drink plenty of water, fruit juices, and other liquids, and eat lightly of nourishing food. Try extra blankets on the bed after a hot bath and a hot drink. This will induce a good sweat together with a slight fever, which is one of nature's ways of getting rid of poisonous products from the germs in the system.

With this treatment the ordinary common cold will yield with surprising swiftness. Within 24 hours you will notice the difference; if you don't, call the doctor.

Just one more point, and this is highly important: If you have to go about with a cold, keep away from others, and every time you cough or sneeze smother it with your handkerchief. That cough or sneeze is loaded with the highly contagious cold germ, and by taking this ordinary precaution you will limit the spread of infection. Don't forget, either, to keep away from babies if you have a cold. They catch infection easily, and an ordinary cold in you may easily become something more serious in a small child.

REPORTS ON CLUB ACTIVITIES

(Continued from Page 141).

members serving overseas. Team for seven-a-side tournament selected. Five entries for the district ensilage competition. Two new members enrolled. Mr. Harvey, manager of the Tairanga Co-op. Dairy Association, addressed the meeting on "The Grading of Cream and the Manufacture of Butter." There was an attendance of eleven members, several older farmers also being present.

Whakatane D.H.S.—Field day in the local slaughter-house. Demonstration on the slaughtering and preparing of a beast for market, by Mr. Moeke, who also showed members how to quarter a sheep carcase. Twenty-five members present. At the previous meeting an interesting talk on "Shelter Belts" was given by Mr. Linsell, after which a discussion followed.

Circulars to Clubs

IT IS essential to conserve paper as a war-time economy, and it is not proposed to send out circulars to clubs in the future unless absolutely necessary. Club officials and members generally should realise that the N.Z. Journal of Agriculture is the official organ of the Y.F.C. organisation. The special Y.F.C. section, devoted to reports and notifications, should be of particular interest to club members. Every member of the organisation either receives a copy or has easy access to one; in consequence it is considered by the Federation that publication in the Y.F.C. section of the Journal should be sufficient notification of any matter that it is desired to bring before the notice of clubs and members. It can also be pointed out that the Journal is a very valuable publication from a farming viewpoint, and as such it is possible to obtain from its pages some useful material for club discussion.

The current number of the Journal should be on hand at every club meeting: it is suggested that before the meeting the chairman and secretary should go through the Y.F.C. section and select items of interest and importance, and have them read out at the meeting. If this is carried out there will be little need for the use of extra paper as circulars. Club officials are earnestly urged to co-operate in this matter.

—SYDNEY FREEMAN, Dominion Organising Secretary.

"He Went Forth"

IN the sixth series of "He Went Forth," March issue of the Journal, J. M. Newton and G. Northcoate, of Five Rivers Club, were designated prisoners of war. This is incorrect, neither of these Y.F.C. members are prisoners of war, but later advice indicates that G. Northcoate has been wounded.

THE GOOD NEIGHBOUR.

From Me To You

I FEEL in a happy mood today, and how I wish I could share it with you! I don't even think there is any very special reason for it, except that I have so many things to do that I don't know what to do first, and so I am just not worrying, and being cheerful as cheerful about it all. I found a verse that I have pinned on the wall in front of me, and here it is in case it may be a help to you as it has to me:

"Do not hurry,
Do not worry,
As this world you travel through,
No regretting,
Fuming, fretting,
Ever can advantage you.
Be content with what you've done;
What on earth you leave undone,
There are plenty left to do."

There, isn't that a cheerful thought? And I know now why I am feeling so carefree when there should be so much to trouble about—it is the spirit of optimism that I have gained after reading your entries for this month's competition. How I did enjoy reading all the Cheerful Thoughts that came tumbling out of my mail, day after day.

And another thing that has made me cheerful was the number of very happy people I saw in the streets one day not long ago—the day when so many of our brave lads came back from overseas on furlough. How I wish I could have taken you down town with me that day, all of you who were too far from Wellington to see the shining happiness on the faces of everyone who walked the streets. It was one of Wellington's most miserable days—cold southerly wind, with a stinging rain, and not a vestige of sunshine anywhere at all, and yet I am sure the skies that day were brilliant for many of you, and what a red-letter day it must have been! To those of you who welcomed back dear ones last month I join with you in grateful thanks for their safe return; and those others of you who still have their big day ahead, keep smiling 'till the boys come home again.

How many people do you know? Do you cultivate making friends as a hobby? It is a grand hobby, and one that I can recommend if you want plenty of variety in your days. George Eliot shared this feeling with me I am sure, when she wrote: "It is always good to know, if only in passing, charming human beings; it refreshes one like flowers and woods and clear brooks." Try making friends with strangers for a while, and see if it doesn't give you a fresh interest in life to share their thoughts, their dreams, and to really get to know the person. If you are lucky with your new friendships as I have been then I know there is no limit to the joy ahead of you. And if you feel now and then that you have neglected things you should have done for the sake of new friendships, don't worry—time spent in making and keeping friends is never wasted.

Mary

England--Afterward

When all is said, and every tongue is silent,
There'll come a new exuberance to earth:
She'll speak in happy syllables like music,
Voicing a purer joy, a kindlier mirth:
And all her creatures shall conspire together
To flaunt a whiter fleece, a gayer feather.

When all is said and bells again are ringing
From battered towers that still have kept their grace,
A brighter green shall rise to heal the meadows,
A lovelier hawthorn veil each wounded place;
And lonely people soberly returning
From a long quest, shall find new lanterns burning.

—*Anne Lloyd.*

CHEERFUL THOUGHTS

True bravery is shown by performing without witnesses what one might be capable of doing before all the world.

Make the most of yourself, for that is all there is of you.

Cheerfulness and content are great beautifiers and are famous preservers of youthful looks.

I do not know of any way so sure of making others happy as being so oneself.

Every man should keep a fair-sized cemetery in which to bury the faults of his friends.

It is an everlasting duty—the duty of being brave.

"The heights that great men reached and kept
Were not attained by sudden flight,
But they, while their companions slept,
Were toiling upward in the night."
—*Longfellow.*

"There are but two powers in the world: the sword and the mind. In the long run, the sword is always beaten by the mind." —*Napoleon.*

Good thoughts, like rose leaves, give out sweet perfume if laid up in a jar of memory.

Strength for today is all we need
For there will never be a tomorrow;
Tomorrow will be but another today,
With its measure of joy and sorrow.

Today is the future from which we hoped so much.

I would rather be able to appreciate things I cannot have, than to have things I cannot appreciate.

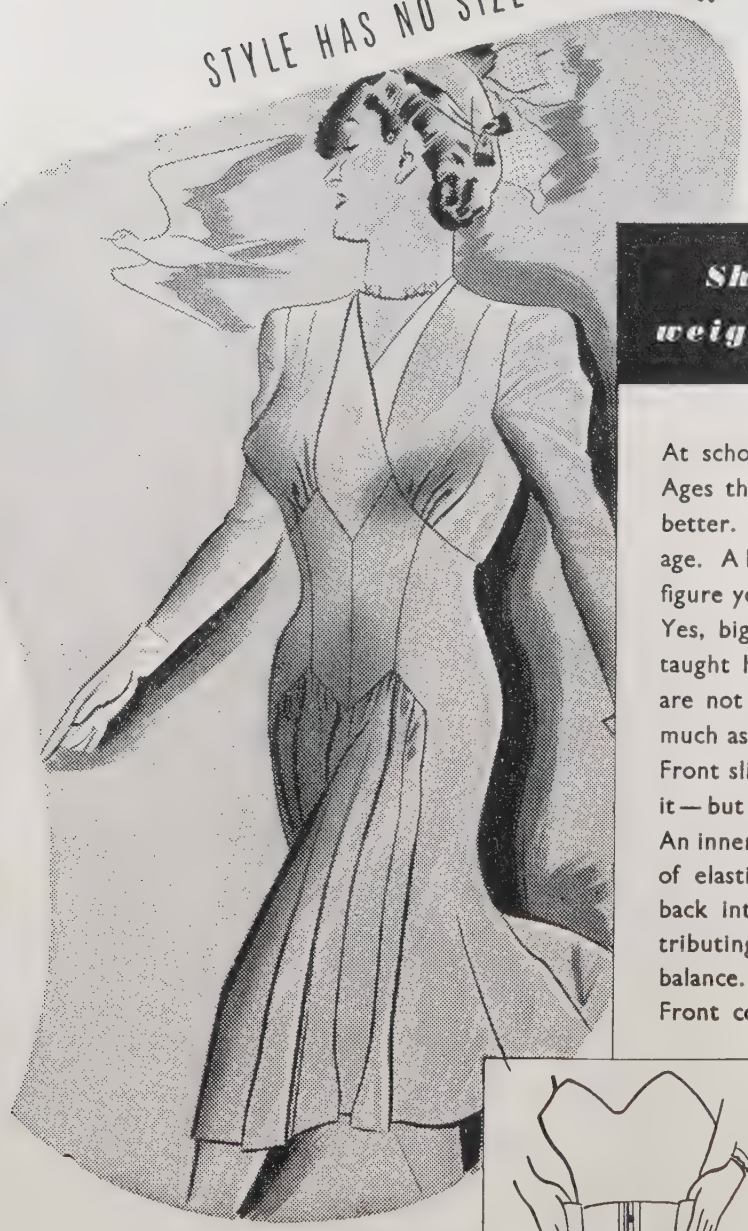
The cheerful live the longest in years, and afterwards in our regards .Cheerfulness is the offshoot of goodness.

In the school of life many branches of knowledge are taught, but the only philosophy that amounts to anything after all is just the secret of making friends with our luck.

Don't do anything 'till you do it; and when you've done it, stop doing it.

I wish, I can, I will — these are the three trumpet notes to victory.

STYLE HAS NO SIZE LIMIT NOW!

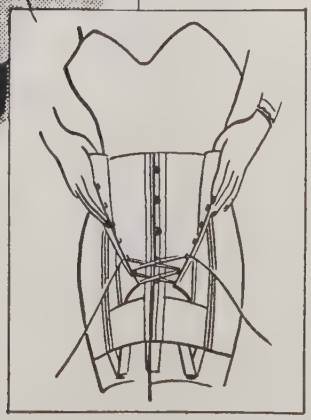


She carries her weight like a girl!

At school she learnt to call the Middle Ages the Dark Ages. At 45 she knows better. Nothing gloomy about *her* middle age. A Modaire Practical Front keeps her figure young.

Yes, big as she is. This foundation has taught her that figure beauty and youth are not a matter of weight reduction so much as weight distribution. A Practical Front slims excess flesh not by flattening it — but by *support*.

An inner belt of strong overlapping bands of elastic lifts the weak front muscles back into their normal position, re-distributing the flesh for beautiful body balance. That's how Modaire Practical Front comes to make such a wonderful difference to posture . . . poise . . . looks. You too, will feel younger, look younger, and stay younger — in a Modaire Practical Front.



MODAIRE

Practical Front

Let's Talk About CHEERFUL THOUGHTS

First Prize

I ONCE read an article on the subject of "Cheerfulness," and a quotation taken from it still remains in my memory. "Next to the sunlight of heaven is the cheerful face." Certainly there is no mistaking this—the bright eye, unclouded brow, the sunny smile, all tell of that joy which dwells within. One glance at a bright smiling face lifts us out of the mists and shadows, and we experience a thrill of pleasure and hopefulness. A cheerful face within the household will keep everything warm and light within. It may be a very plain face, yet there is something in it we feel but cannot express; there is a world of blessed magic in the plain cheerful face, and we would not exchange it for all the soulless beauty that ever graced the fairest form on earth.

In closing here is a good hint which comes from an old autograph book of mine, it was contributed by a very fine and well loved teacher. "Fellow creatures, don't let your faces become square and angular; full of abrupt corners, with never a curve in their whole outline, so that a dimple on a cheek would be as out of place amidst its rugged surroundings as a freckle on the features of an elephant. There is a good way to prevent this, and that is at the end of every day to put aside all ugly ways, the selfishness, the greed, and the hardness of heart begotten of the world and its usages, forget all differences and disputes, right all outstanding wrongs, let bygones be bygones, sit by your fireside, listen to your wireless, or take up your knitting, even indulge in a little leisure and enjoy a brief sway over your heart in peace undisturbed." Hoping this thought cheers others on their way as it has with me.—**Hoya, Okoia.**

Second Prize:

IN THE early days of the war I was returning to New Zealand from England. Our nerves were all on edge, for a ship had been torpedoed the previous day, and we were all waiting for the submarine to pop up and give us a charge. Suddenly a little girl piped in her childish treble the well-known words of the old song "Pack up your troubles in your old kit bag, and smile, smile, smile." At once the tense atmosphere cleared, and we laughed and applanded. Moreover, the ship was not torpedoed. We've all got our troubles, some big, some small, but somehow they don't seem so bad if we pack them away, and look for the silver lining. I don't like getting up to milk these wintry mornings, but doesn't the sun look glorious rising over the hills, and doesn't that cup of tea taste good when I come back from the shed!

It was a real trouble to me when the last girl I had at home left me to train as a nurse, but when I met Matron the other day, and she told me how well my girl was getting on, I was glad I'd packed up my troubles and let her go. I thought of one of Granny's wise sayings: "There's a thorn with every rose, but aren't the roses sweet?"—**Susan, Northland.**

THESE days we are all urged to practise thrift, and rightly so, but what has this to do with cheerful thoughts? Quite a lot I think when one reads that it takes 32 muscles to produce a frown, and only 8 to register a smile. Let's remember not to overwork these muscles; and now for a cheerful verse:

"Every day is a fresh beginning,
Listen my soul to the glad refrain,
And in spite of old sorrow and older sinning
And troubles forecasted and possible pain,
Take heart with the day, and begin again."

This verse was written by Susan Coolidge, and it has been such a good friend to me.—**Laurel, Feilding.**

FOR many years I have always written any helpful and encouraging verse or saying that has appealed to me in my recipe book along with my recipes, and this idea has proved a wonderful success, making my recipe book doubly valuable and quite indispensable. I have had considerable difficulty in selecting my favourite quotation, but I have selected the following one for I am sure there are many young wives like myself who feel very alone in this world, and occasionally afraid of the future, and who because of existing circumstances are living as I am with friends or elsewhere in surroundings which are not always the pleasantest. Since my husband went away life has not run smoothly, baby constantly ill, and it seemed life was just one worry after another, until at one stage I got down to it properly. Then I think this verse gave me more confidence in myself, and helped me to "square my shoulders and hold on tight and smile too" than anything else.

"Unless a woman can—

Believe in herself, she cannot believe in other women;
Learn to master her own thoughts, she will always be a slave to fear;
Laugh at her own troubles, they will surely overwhelm her;
Know the past, she cannot face the future;
Trust facts, she cannot be sure of anything;
Keep old friends, there is little value in making new ones."

These are trying times, and we womenfolk all have our trials too, but a helpful straight thought is easily carried about, and how helpful it can be to us too.—**Dreamer, Marlborough.**

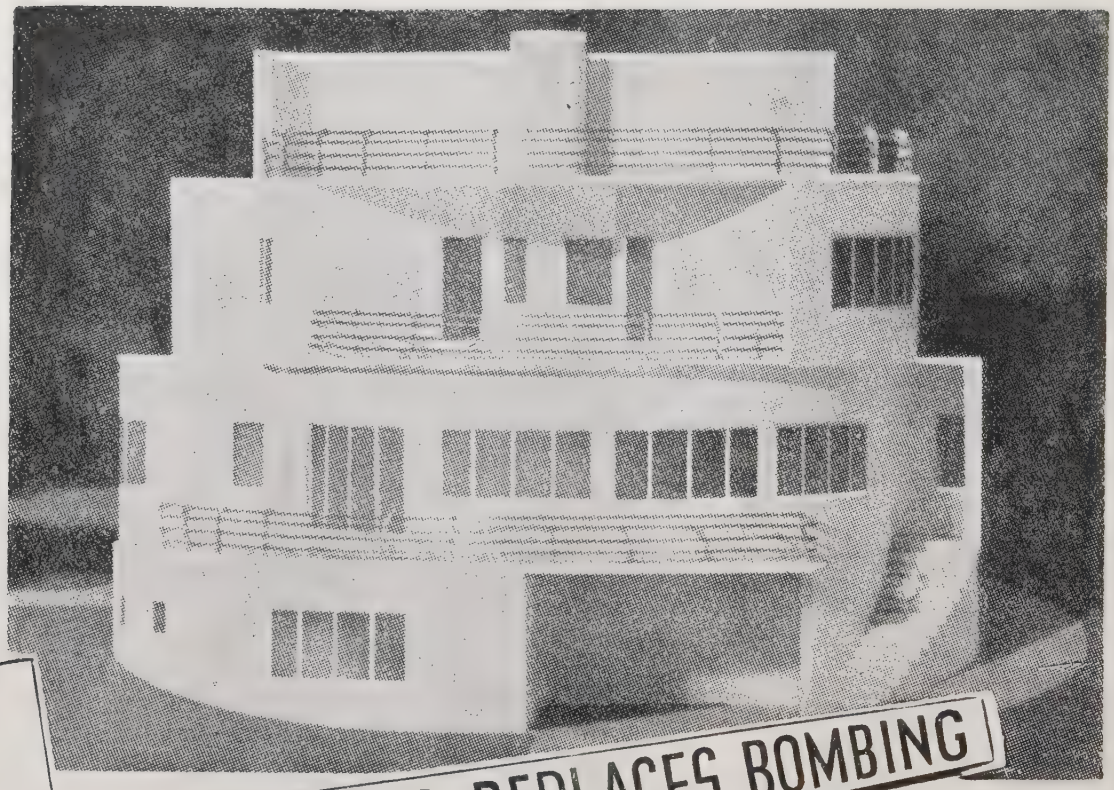
THE words I have found most comforting and cheerful through all the difficult war years are these lines of Browning's:

"One who never turned his back, but marched breast forward,
Never doubted clouds would break,
Never dreamed, though right were worsted, wrong would triumph,
Held we fall to rise, are baffled to fight better, sleep to wake."

To me this verse gives a clear picture of courage, faith, hope and tolerance—a cheerful outlook on life in all its most trying aspects. Not only the thoughts expressed but the very lovely and rythmical arrangement of the words seem of themselves to lift my spirit up and up to a place in the sunshine "One who . . . never doubted clouds would break." — **A. M. Doweli, Inglewood.**

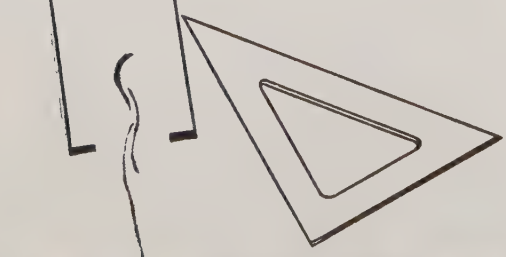
WHAT a grand competition this one has been! I only wish I had enough space to print every cheerful thought that was sent to me, but I have tried to choose those that I think will be of most help and comfort to you in these worrying days, and I am sure you will all feel refreshed in spirit after you have read the handful of thoughts I have gathered for you this month.

First prize to "Hoya," Okoia, for her splendid entry, with "Susan" of Northland a close second. And I am sure you will enjoy "Laurel's" entry too, so she is highly commended.

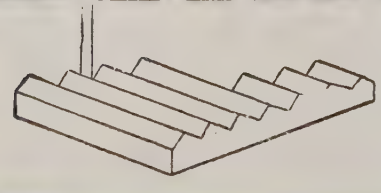


WHEN BUILDING REPLACES BOMBING

When the war is won, a brave new world will arise from the ashes of the old, and with it many good things will be restored to us. Among them will be Onehunga Blankets, available again in plenty. If you cannot buy Onehunga Blankets to-day, remember that the needs of the forces come first, and that Onehunga Blankets are one of the good things worth waiting for in our world of to-morrow.



ONEHUNGA



ONEHUNGA BLANKETS—AIR CELL BLANKETS — ONEHUNGA TRAVEL RUGS — ONEHUNGA WOOLLENS.

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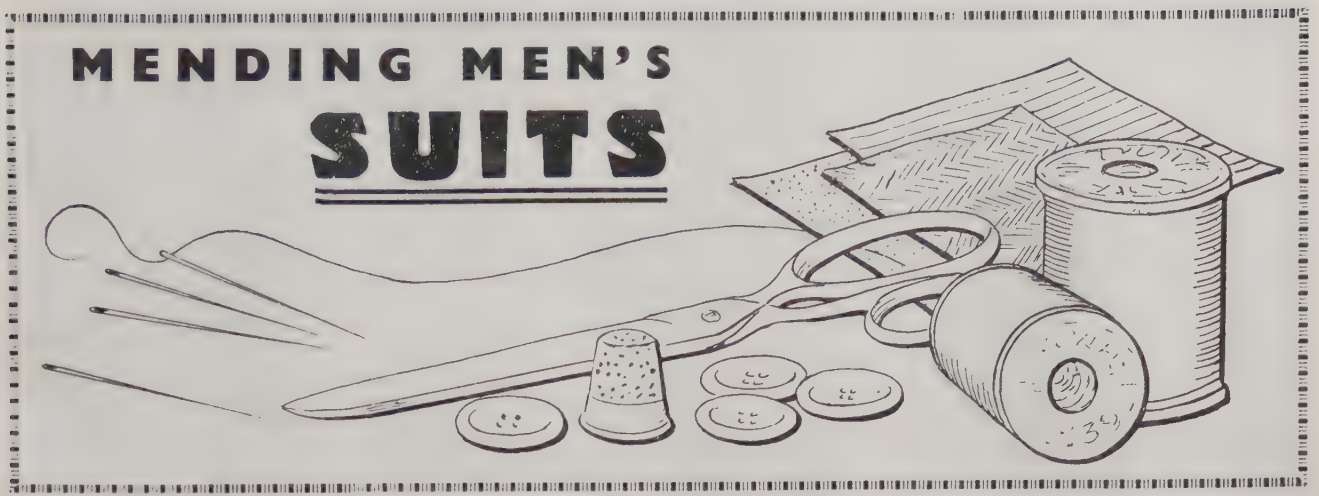
MENDING MEN'S SUITS



I THINK I can promise you a real treat for the next few months, for I am sure that you will all agree that the articles we are going to print under the heading of "Mending Men's Suits" are going to be really worthwhile, every word of them. These articles, fully illustrated and written by Clarice L. Scott and Anne F. Hagood of the Textiles and Clothing Division, Bureau of Home Economics, Agricultural Research Administration, have been issued by the United States Department of Agriculture.

The article which we print below gives you a few general tips on the care and mending of men's suits, and the articles to follow will include hints for guarding against wear, coat repairs, trouser repairs, and other very useful tips. Be very sure you keep all the articles in this series, for I know they will be invaluable to you.

SOLDIERS — sailors — and airmen fighting for us on many battle-fronts need warm wool clothing. Whether they have it or not can make the difference between comfort and suffering — between life and death — between victory and defeat.

For the duration, therefore, wool has become a vital war material. Civilians can make victory begin at home by taking good care of the wool goods they already have—by not making demands on the country's limited supply.

One of the biggest uses of wool in the past has been in the manufacture of men's suits and overcoats. Although use of wool in garments now being produced has already been curtailed, civilians can save even more wool by making suits and overcoats now on hand last longer. Not only will this save wool, but valuable man-hours of factory labour can also be turned to producing more goods for our expanding military forces.

Before you rip . . . cut . . . stitch, make sure you have on hand mending supplies that will make your work easier and your results better looking. Try to find thread, lining cloth, buttons, and other materials that match as nearly as possible those in suits on hand.

MENDING MATERIALS

THREAD.—Buy three-cord mercerized thread, size 0, for stitching. This is stronger than thread ordinarily used for home sewing. Buy darker rather than lighter colours if you can't get an exact match. Usually, black thread looks better than blue on a navy suit because blue thread works up much lighter than it appears on the spool.

Best thread for stitching buttonholes is buttonhole twist made especially for men's suits. It is heavier than that sold at haberdashery counters for women's clothes and lighter than the kind for overcoats. This twist is sold by the yard, eight strands braided together. Three-fourths of a yard will make eight average buttonholes.

BEESWAX.—A piece of beeswax is helpful in waxing thread for sewing on buttons and reworking worn buttonholes, and for waxing the cord over which buttonholes are worked.

BUTTONS. — Keep buttons from worn-out suits to replace those lost or broken. If you haven't done this, buy matching pants buttons, they are not expensive.

LINING.—Get rayon lining materials that will not melt when you press them. If there is no label, ask your dealer what kind of material it is. Preshrink lining material before you cut it—otherwise it may shrink when cleaned so that seams pull out. When you buy dark linings, ask for those that will not rub off on white shirts.

POCKETING.—If possible get cotton twill made especially for inside trouser pockets. This is a sturdy material that outlasts muslin. It comes in 30-inch widths, so that two side pockets can be cut from one length. The amount needed to make two side pockets is about 16 inches. Pocket lengths vary, so measure before you buy. Remember to allow some extra for seams.

GUARDS.—Best wear guards for trouser cuffs are made from wool cloth, the same as the suit. But if you have no extra pieces of suiting, use heavy cotton tape about five-eighths inch wide or sturdy matching cotton turned under on each side.

PRESSING SUPPLIES.—You need to steampress wool as you make most repairs if you want the finished work to look well. So have on hand a sponge and press cloths—one of cheesecloth for quick pressing, one of firm cotton for the final pressing.

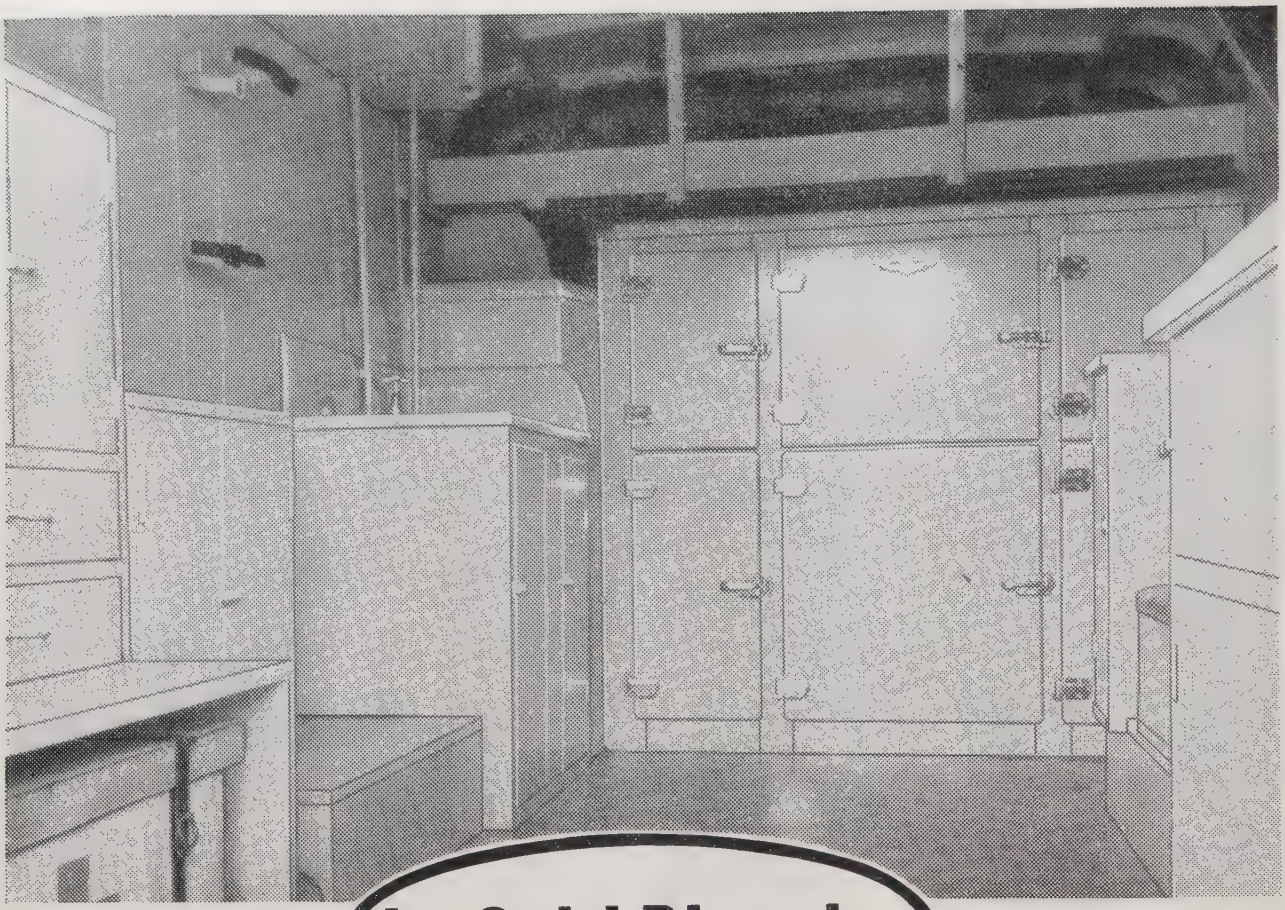
When you press, dampen the place to be pressed with warm water. Lay the press cloth over it. Set the iron down squarely on the press cloth . . . lift the iron . . . set it down again. Never press moisture completely out of wool or it will look hard and lifeless.

SCRAPS.—Save scraps of matching suit material for future repairs. If your suits are made to measure, get a few scraps left over from fitting. On ready-made suits, save the pieces cut off in making alterations.

CARE SAVES MENDING

Here are a number of preventive measures that make a suit "live" longer and help cut down on repair jobs.

BRUSH AND AIR.—Brush suits often —in the direction of the grain of the cloth. Brush inside the suit as well as out, in and around pockets . . . inside cuffs if there are any.



PHOTOGRAPH OF INTERIOR OF

In Cold Blood...

MOBILE BLOOD TRANSFUSION UNIT

In cold blood, chilled blood plasma, there is a wealth of swift healing for wounded men. That is one of Frigidaire's jobs to-day—the building of mobile blood transfusion units for the armed forces . . . one of the reasons why some civil refrigeration wants must wait. But Frigidaire dealers, in spite of all difficulties, can still take care of your Frigidaire unit. Entrust YOUR Frigidaire investment only to qualified Frigidaire-trained men.

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is still equipped to give you Frigidaire Service

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If a closet isn't well ventilated, it's a good idea to let a suit hang in the open to air before it goes into the closet. From time to time, give suits an outdoor airing.

If a suit gets soaked in rain or snow, let it dry slowly in a well-ventilated room, away from heat. Brush the suit well after it dries.

HANG IT STRAIGHT.—Put suit on a hanger as soon as you remove it. Don't spoil the press by laying it carelessly over a chair.

Put coat on a wooden hanger—one with broad shoulders made especially for men's shoulders. See that shoulders set squarely on the hanger.

Hang trousers on a special trouser hanger or over the cross bar of a wooden hanger. If you must use a wire hanger, place a heavy piece of cardboard or a thick piece of paper over the crossbar first to help prevent crosswise crease on the trousers. Pull trousers through the hanger as far as the width of the hanger will allow so that the thicker part of the trousers lies over the hanger bar. Creases here show less than in the middle of the trouser leg.

When then is no hanger at hand, use the loop at the back of the neck to hang a coat. Or hang it over the back of a chair. But save the shape of the shoulders and collar . . . pinch up the coat back so that the shoulders rest on the corners of the chair.

REGULAR CLEANING & PRESSING.—Dirt grinds into wool and makes it wear out more quickly. Take your soiled suits to a cleaner who does a thorough cleaning job. More drastic—and therefore more wearing—cleaning methods are needed for badly soiled suits.

If you press suits at home between cleanings, look for spots before you press. A warm iron "sets" spots so they will never come out. Always steam press wool—never set the iron directly on the wool itself, and be careful about scorch. Wool can scorch even when you have a cloth over it if your iron is too hot.

PROTECT AGAINST MOTHS.—Clothes moths can undo all your saving of wool. Never leave woollen clothing lying around on closet shelves. If you have a woollen garment hanging in the back of the closet, air and brush it once in a while.

Before storing wools away for a season have them dry-cleaned, or brush and air them thoroughly in the sun.

Store wool suits and overcoats—or have them stored—in paper bags, wrapped in paper, sealed in boxes, or in trunks, chests, or tight closets. Seal paper bags and packages. Trunks and chests must have tight-fitting lids. A closet set aside for storage of wools should have all cracks in plaster and around baseboards filled up and a gasket on the door so that it shuts tightly.

Play safe by using flakes, crystals, or balls of naphthalene in wool you store at home. As these preparations evaporate they give off a gas that first discourages the moth larvae from feeding on wool and then, if concentrated enough, kills them.

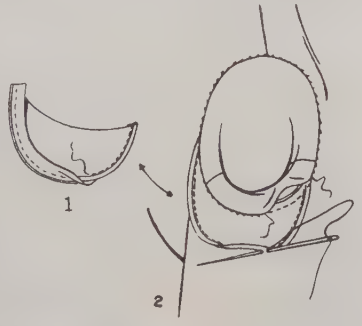
About 1 pound of flake naphthalene is enough for a small chest, trunk, or box. Sprinkle through folds of clothing around cuffs and creases, tie in sacks on hanger necks, slip into pockets, or hang high in closets.

GUARD AGAINST WEAR

Make a suit wear longer, postpone more difficult repairs with shields, wear shields, wear guards, and retreads. Sew these into a suit when it is new. There is no need to wait until it shows wear.

SHIELDS.—Wear and perspiration can soon cause holes under the arms in a suit lining . . . can stain and mat the outer material of the coat. Guard against this with shields that tack in.

Make underarm shields of fabric that matches or is similar to the suiting in the coat. Or, if you cannot get



similar material, make shields of rayon lining.

Cut two pieces of wool cloth the shape of shields—one to be sewed in under each armhole.

1. Bind all around with rayon. Rip the lining apart from the armhole just far enough to tack the shield in place.

2. Slip-stitch shield to the coat lining around the outer edge. Sew the lining back in around the armhole.

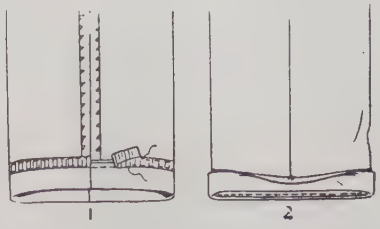
WEAR GUARDS.—Wear guards, protect trouser legs from the rub of shoes. To make them, use heavy tape or leather, about five-eighths inch wide, or cloth cut from the leg seams.

To put a wear guard on trousers with cuffs, first turn down the cuff.

1. Baste the guard on just inside the leg next to the fold that will be the bottom edge of the trouser. Stitch by machine along both edges of the guard.

2. Turn the cuff back and tack it in place.

To put a wear guard on trousers without cuffs, first rip open the hem.

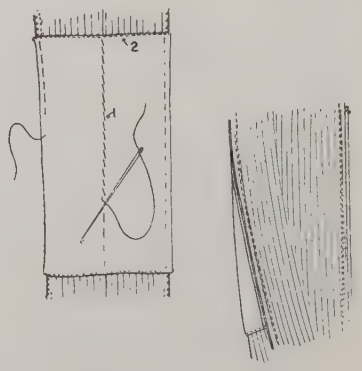


Baste, then stitch, a guard on just inside the lower edge of the leg—on the hem side of the bottom crease. Then rehem the trousers.

KNEE RETREADS.—These are rayon pieces set in from seam to seam across the front where trouser legs get the most wear and where they are often damaged by perspiration. Retreads on the knees also help to hold in a press.

Cut two rectangular pieces of rayon lining material as wide as the front of the trouser leg near the crotch, and as long as it is from the level of shorts to 3 or 4 inches below the knee. Turn under and stitch the top and bottom edges of each retread.

Pin and baste the retread along the outside trouser seam so it will extend below the knee 3 or 4 inches. Then



pin and baste the top edge of the retread to the trousers. Baste it along the front trouser crease.

1. Tack along one side of the trouser crease with tailor's basting. Smoothe the retread over to the inseam, pin, and baste to the seam line. Trim off excess material.

2. Slip-stitch the retread loosely to the trousers along the top edge so that it will not hinder dressing. Be sure the stitches do not show from the right side. Leave the lower edge loose.

3. Stitch exactly on the original seam lines. This must be done by turning the legs over and stitching from the back of the seams, because the retread covers the stitching at the front.

(To be Continued).

I WONDER if these lines will cheer your readers?

"To cheer the world when things went wrong,
And nothing seemed worthwhile,
To help to lighten life's hard load
God made a pleasant smile.
To still the pain of aching heart,
Too hurt and sore to weep;
To dull the throng of memories
God made a dreamless sleep.
To share life's joy or sorrow
Whichever fate may send,
To help him in an hour of need
God made of man a friend."

—Poppy, Havelock North.

To remove lettering from flour bags sprinkle the letters with kerosene, and let them stand overnight. Then wash and boil in the usual way.

Competitions

AUGUST:

You will be sure to let me have the entries for this month's competition by September 15th, won't you? You will remember that you are going to share with us your ideas on how you have arranged your household duties to allow you to do more on the farm.

SEPTEMBER:

Economic and other conditions today are such that it is not always possible for mothers to have their babies when they please. And this is sure to reflect in after-years in the children of tomorrow. So I have chosen for this competition a subject which I think should appeal to many of you:

"YOUNG OR OLD—WHO MAKES THE BETTER MOTHER?"

Your ideas on this subject, and reasons why a young or old woman makes a better mother will be valuable to many wartime wives, so send in your entries. The first prize is 10/- and the second 5/-, and the competition closes on October 15th.

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RAINSTER ON ACTIVE SERVICE

Smart? Yes, Rainsters are smart. Perhaps you've had difficulty in getting your smart Rainster — for even in your civilian war job: industry, E.P.S., canteen work, you still like to look smart.

But Rainster is on active service now. And you know how it is, the Services must come first; and the demands of the Red Cross Transport, W.A.A.F., W.R.N.S., and Navy take most of the output of Rainsters from Rainster House, the smart home of Rainsters. Every hour, every day, week, month, more and yet more, and still more Rainsters for the Services — and every one a smart Rainster. So if you can't get your civilian Rainster . . . too bad; but you'll understand, you'll see how it is — the war must be won.

Rainster

Mary's Mixing Bowl

New Ways With Meat Dishes

IN TIMES of war and stress, even more than in the days of peace and plenty, meat is a food it pays to buy and cook with care. This month I have selected for you some extra-special recipes which may give a new outlook to your meals, because they are really unusual. Some of the recipes are for braising meats, and especially for those of you who live in districts where power is precious this winter, I know these recipes will be of great value, for braising is one good method of saving current.

Braising in a tightly covered pot combines browning with steaming and stewing, and develops rich flavour in meat. This is a good way to cook meat which is not quite as tender as it might be, and it is also good for cuts that are too lean for open-pan roasting. The quantity of steaks or chops to allow per person to be served depends largely on individual choice, and on the cut of the meat selected, but for pot roasts an allowance from ½ to 1 lb. of untrimmed cut, depending on how much bone it contains, is suggested.

BEEF BIRDS.

2 pounds beef round steak, ½ cup chopped celery and leaves, 1 onion (chopped), 4 tablespoons fat, 2 cups soft bread crumbs, salt and pepper to taste, herb seasoning, if desired.

Have the round steak sliced about ½ inch thick. Cut it into strips 2 to 3 inches wide and about 4 inches long. Pound the pieces to flatten them and help make the meat tender. For the stuffing, cook the celery and onion in 2 tablespoons of the fat for a few minutes, add the bread crumbs and seasonings, and mix thoroughly. Put stuffing on each strip of meat, roll, and skewer or tie in place. In the remaining 2 tablespoons of fat, brown the birds slowly on all sides, then cover and cook until tender in a moderate oven (350 deg. F.)—allow about 1½ hours. Or, finish the cooking on top of the stove. Serve the pan drippings with the meat.

STUFFED BEEF FLANK STEAK.

Flank steak of beef, ½ cup chopped celery and leaves, 1 small onion (chopped), 4 tablespoons fat, 1½ cups soft bread crumbs, salt and pepper to taste.

Select a large flank steak or two small ones, not cut or scored. For the stuffing, cook the celery and the onion in 2 tablespoons of the fat for a few minutes, add the bread crumbs, and season with salt and pepper. Spread the stuffing over the steak. Beginning at one side of the steak, roll it up like a jelly roll, and tie securely in several places with clean string.

Brown in 2 tablespoons of fat in a heavy frying pan or a baking pan, on top of the stove. Turn the meat frequently until browned on all sides. Slip a rack under the meat in the pan, cover closely, and cook until tender in a moderate oven (350 deg. F.)—about 1½ hours.

Start the carving at the end of the roll and cut across the grain, so that each serving is a round slice with the stuffing in the centre.

For
SUCCESSFUL BAKING

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SWISS STEAK.

For Swiss steak select about 2 pounds of beef from the rump, round, or chuck, or a slice of veal, cut fairly thick. Season the meat with salt and pepper, sprinkle with flour. Pounding helps to make the meat tender. Cut the steak into individual portions and brown in suet or other fat in a heavy frying pan or kettle. Then add canned or sliced tomatoes, or water to cover. Partly cover with a lid and simmer for 2 to 2½ hours, or until the meat is tender enough to cut with a fork. Serve the gravy over the meat.

With macaroni (as Spanish Steak).—Follow the recipe above, using 1½ pounds of meat, and a quart of tomatoes as the liquid. Cook ½ pound macaroni in boiling, salted water until tender, and drain. Brown ½ cup chopped onion and 1 large chopped green pepper in fat. Add the macaroni, onion, and pepper to the tomato gravy, and serve over the meat.

Smother with onion.—If the steak is from the round, rump, or chuck, or if it is a flank steak, follow the recipe for Swiss steak, and add sliced onions during the last half-hour of cooking.

If it is a beef porterhouse or sirloin steak, but very lean, brown it on both sides in suet, or other fat; then remove from the pan. Brown sliced onions in the same pan. Put the steak back, cover with the onions, sprinkle with salt and pepper, put a lid on the pan, and cook slowly for about 15 minutes.

BRAISED CHOPS WITH NOODLES OR RICE.

For braising, use veal or very lean lamb or pork chops. Cut through the edges in several places to prevent curling. Sprinkle the meat with salt, pepper, and flour, and brown in fat. Cover the pan, and finish the cooking slowly for ½ to ¾ hour, or until the meat is tender. Serve the chops and drippings on a platter with a border of boiled noodles or rice.

POT ROAST OF BEEF OR VEAL WITH VEGETABLES.

Select a piece of beef or veal weighing 3 to 5 pounds from the chuck shoulder, rump, or round. Sprinkle the meat with salt, pepper, and flour, and tie or skewer into compact shape. Brown the meat in a heavy pot; use suet if the meat is very lean. Then slip a low rack under the meat to keep it from sticking to the pot. Add ½ cup of water, cover with a close-fitting lid, and cook slowly over a low fire for 2½ to 3 hours or until the meat is tender when pierced with a fork. During the last hour or when the meat is almost tender, add onions, carrots, or potatoes. Cook until both meat and vegetables are tender, then remove them to a serving platter and keep hot. Make gravy with the drippings.

Oven pot roast.—After seasoning, the meat, lay pieces of suet, salt pork, or bacon over the top. Put the meat on a rack in a roasting pan, cover closely to hold in steam, and cook until tender in a moderately hot oven (about 375 deg. F.). This will probably take from 1½ to 2½ hours, depending on the size and tenderness of the cut. About 35 minutes before the meat is done, put pared raw potatoes of medium size into the pan around the meat. Turn the potatoes in the dripping and sprinkle with salt. Cover and cook until meat and potatoes are tender, then remove the lid to allow them to brown before serving. Make gravy of the dripping.

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Table of Contents—August, 1943.

Bees in Relation to Agriculture—E Smellie	73
Rubber Production in New Zealand—V. D. Zotov and E. P. White	75
Low Germination of Ryegrass Seed in South Otago—A. F. Greenall	79
Lupin Poisoning of Sheep—A. G. Brash	83
Weeds—S. H. Saxby	85
Pig Management: Whey for Pig Production is Worth One Porker per Cow—Livestock Division	91
Eradication of Gorse—P. S. Syme	95
Conservation of Farm Machinery: Electric Motors on the Farm	97
Soil Erosion: What is Soil Erosion?	103
Should Pullets be Used as Breeding Stock—F. C. Bobby	107
Thousand-Headed Kale as a Fodder Crop—W. R. Lobb	111
Veterinary Notes—Livestock Division	115
Farm Practice and Management—Fields Division	123
Radio Broadcasts	124
Slaughterings of Stock	124
The Orchard and Vineyard—Horticulture Division	127
Guide for the Home Garden—Horticulture Division	131
Apiary Notes—Horticulture Division	134
Poultry-Keeping Section—Livestock Division	136
Young Farmers' Clubs—S. Freeman, Editor	138
Health Notes—Department of Health	142
"The Good Neighbour" by Mary	143

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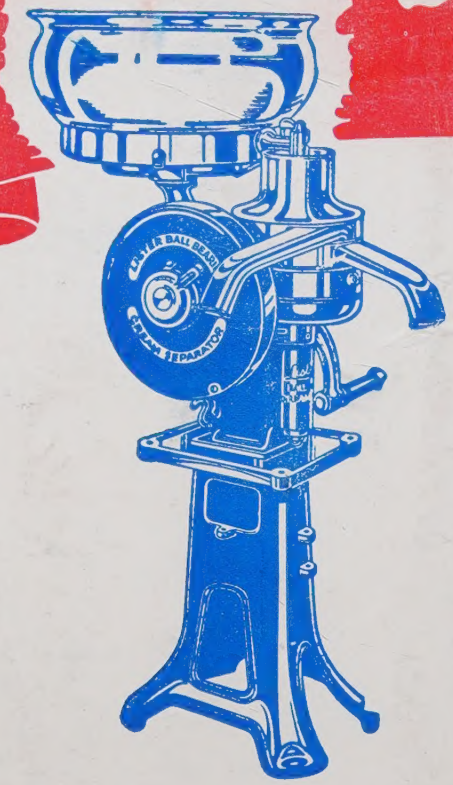

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